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October 17, 2002

Mary L. Fulghum
Associate Regional Counsel
United States Environmental Protection
Agency
77 West Jackson Boulevard
Chicago, IL 60604

Re: *DuSable Park Thorium Issues*

Dear Mary:

At your request following our meeting of October 10, 2002, I enclose information pertaining to the issue of when and by whom certain imported soil was placed upon the DuSable Park site. Specifically, I enclose the Environmental Reconnaissance Report of STS Consultants, Ltd. dated March 30, 1989, commissioned by Chicago Dock and Canal Trust. With respect to the issue of fill placement, I direct your attention to pages 14-15 and 18 of the Report. For your further information, CPD obtained title to the property by quit claim deed dated December 30, 1988.

Please call me if you have any further questions or comments about the enclosed materials.

Sincerely,

Ed Walsh/cap

Edward V. Walsh, III
for SACHNOFF & WEAVER, LTD.

EVW:cap
Enclosure

cc: Maria Guadalupe Garcia, Esq., Chicago Park District

STS Consultants Ltd.
Consulting Engineers

Environmental Reconnaissance

E. North Water Street and Lake Shore Drive
Chicago, Illinois

Chicago Dock and Canal Trust

REPORT

March 30, 1989

Mr. Tom Walker
Chicago Dock and Canal Trust
401 N. Michigan Ave.
Chicago, IL 60601

RE: Environmental Reconnaissance of the Chicago Park District Dedication Property, E. North Water Street and Lake Shore Drive, Chicago, Illinois -- STS Project No. 25400-XH

Dear Mr. Walker:

STS Consultants, Ltd. has completed the environmental reconnaissance of the Chicago Park District Dedication properties near the Chicago River. The reconnaissance consisted of sequential project tasks which included a site history and background review, subsurface exploration and chemical analyses of selected site soils and Chicago River sediment. A discussion of the exploration methods, the results, interpretations and recommendations are presented in this report.

STS has appreciated the opportunity to work with The Chicago Dock and Canal Trust on this project. If you have any questions regarding the information contained in this report, please feel free to contact us.

Sincerely,

STS CONSULTANTS, LTD.

David L. Grumman, Jr.
Project Geologist

Richard G. Berggreen
Principal Geologist

DLG/ccb

encl.

STS Consultants Ltd.
Consulting Engineers

111 Pfingsten Road
Northbrook, Illinois 60062
312.272.6520/Fax 312.498.2721

Report

Project

ENVIRONMENTAL RECONNAISSANCE OF THE
CHICAGO PARK DISTRICT DEDICATION PROPERTY,
E. NORTH WATER STREET AND LAKE SHORE DRIVE,
CHICAGO, ILLINOIS

Client

CHICAGO DOCK AND CANAL TRUST
401 N. MICHIGAN AVE.
CHICAGO, IL 60601

Project # 25400-XH

Date MARCH 30, 1989

STS Consultants Ltd.
Consulting Engineers

111 Pfingsten Road
Northbrook, Illinois 60062
(312) 272-6520

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ENVIRONMENTAL RECONNAISSANCE
CHICAGO PARK DISTRICT DEDICATIONS
E. NORTH WATER STREET AND LAKE SHORE DRIVE
CHICAGO, ILLINOIS

PROJECT OVERVIEW

STS Consultants, Ltd. has completed the environmental reconnaissance at the proposed Chicago Park District Dedication property. The property consists of two areas, the first being approximately 700 feet of Chicago River frontage (north bank) just west of Lake Shore Drive, and the second being the area east of Lake Shore Drive at E. North Water Street, also known as DuSable Park. The area along the Chicago River is to be developed into a pedestrian esplanade consisting largely of paved areas interspersed with landscaping. DuSable Park will have a paved walkway along its perimeter and will be landscaped with grass and trees.

The parcels have a long and varied history of development and use. The site emerged from Lake Michigan during the mid-19th century as a result of shoreline sedimentation after the creation of the Chicago River extension into the lake. Since the turn of the century the site thrived as a center for commerce and manufacturing until the last few decades when the site returned to mostly vacant parcels. While there exist only a few physical remnants of past usage on site, existing environmental conditions may be affected by previous site usage.

An environmental reconnaissance is the first step to examine and evaluate site conditions to identify possible environmental degradation or impairment. Environmental problems typically involve potential, actual and or alleged hazardous chemical contamination above or below ground at the site being studied. In

accordance with the proposed scope of work, the emphasis of the work performed has been to attempt to identify past and present site conditions having the potential for contributing to environmental degradation of the site.

The results of the historical background review did not identify any known incidents of environmental impairment. Based on the findings of environmental exploration at other urban properties, which have had similar histories as the Chicago Park District Dedication property, it can be anticipated that some minor evidence of impacts on environmental quality will be found. Soil borings and analytical testing of the near surface soils and Chicago River sediments observed materials, such as cinders, coal, treated wood, and miscellaneous fills, which could be sources of trace levels of contamination at the site. The results of analytical testing for over 100 regulated pollutants identified several pollutant compounds on site, although none at levels which would categorize materials on site as hazardous waste. The trace concentration of these pollutants evident on site and the knowledge that such pollutants are commonly observed in downtown Chicago fill materials suggest that it is unlikely that the site will require any substantial remediation. Given the intended usage of the study property, several precautionary remedial measures are recommended, including the removal and proper disposal of construction related excavation spoils, and the application of a suitable ground cover. Proper disposal may require disposal in a permitted landfill. A suitable ground cover may involve placement of an adequate thickness of soil to minimize potential contact with these old fill soils.

This report presents the results of our findings and observations. Based on the data gathered, an opinion regarding actual or potential environmental degradation of the study parcels along with our recommendations for further exploration and remediation are presented in this report.

Scope of Work

The scope of work for these explorations consisted of a focused project approach whereby each successive project phase was based in part on the findings of the preceding phase(s). The property covered by this survey included nearly 700 feet of the north bank of Chicago River frontage just west of Lake Shore Drive, the property east of Lake Shore Drive at E. North Water Street, also known as DuSable Park, and a portion of the Chicago River bordering DuSable Park on the east and north. Specific project tasks included performing a site historical and background review, subsurface drilling, soil classification, and analytical testing of selected soil, fill and river sediment samples. The site background review and walkover observations were used to select boring locations. Analytical tests, encompassing a nearly complete priority pollutant panel and asbestos, were performed on 16 soil, fill and sediment samples to provide a general characterization of soil and sediment chemistry.

The scope of work for the environmental reconnaissance of the Chicago Park Dedication property consisted of a series of tasks designed to broadly characterize environmental conditions. The scope of work was developed in response to the environmental audit specifications stipulated by the Chicago Park District in a letter to the Chicago Dock and Canal Trust dated December 23, 1988. Specifically, the project tasks included:

- Site information and historical review, focusing on past site usages and their associated environmental concerns using available informational resources.

- Site walkover to observe present site conditions and possible sources of environmental impairment.

- A subsurface exploration wherein at least one boring per parcel was performed to collect soil samples and observe subsurface conditions.

- Analytical testing of selected near surface soil samples to quantify the presence of over 100 different organic, inorganic, volatile, and semi-volatile pollutants and asbestos.

Additionally, information gathered from an earlier environmental reconnaissance (ER) of the subject property was also reviewed and incorporated in this analysis. Among the previous ER tasks were a site history review, site walkover, drilling and sampling, analytical testing of soil and a geophysical (electromagnetic) survey of DuSable Park.

The purpose of this report is to describe the data reviewed, exploration and testing procedures utilized, test results, and a summary of the observed existing site conditions with regard to current environmental considerations and standards.

This report also presents recommendations for further exploration which were developed in consideration of several factors including the intended development and usage of the site, the environmental context of the site's urban location, and the findings of this study and previous environmental site work in the site vicinity. Recommendations for special material handling and remediation consideration during construction and development are also included.

- Chicago history and land use documentation

- Regulatory agency records

- Previous subsurface explorations on site by STS

A chronological list of specific references reviewed is included at the end of this report.

The review of these materials in conjunction with the site observations provided a useful but fragmented history of the study parcels. Through consulting several informational sources, general vicinity site usage was determined such that possible sources of potential environmental contamination could be assessed. Several other unpublished maps and public record informational material sources regarding Chicago history in STS's files were also reviewed. IEPA file information was consulted to review information regarding the environmental conditions on and off site. The Illinois State Fire Marshal's Office was notified to determine whether any underground storage tanks (UST) were registered at this property.

Because of the site and vicinity's history of varied commercial usage, a review of all the potential informational resources was not performed. Such resources were not exhaustively researched for three reasons: 1) it appears that site usage did not change significantly over the last century; 2) site usage apparently did not tend to involve the handling and disposal of large quantities of hazardous chemicals; and 3) virtually all of the informational resources consulted tended to corroborate one another.

Site Walkover

A walk-through reconnaissance of the site was conducted to visually observe environmental conditions on site and select appropriate boring locations. Observations were made of site conditions to identify environmental considerations which could potentially impact the intended usage of the Chicago Park District Dedications. Among the objectives of the walkover was to search for evidence of environmental impairment, if present, such as chemical spillage, unusual fill materials, buried wastes, stressed vegetation, monitoring wells and indications of underground storage tanks. Observations of the site were hampered in part because of snow cover across portions of the site. Site observations from a May, 1988 site reconnaissance were reviewed for evidence of changed site conditions.

Electromagnetometry

Electromagnetic (EM) terrain conductivity data was collected over the DuSable Park study area for a geophysical survey conducted during a previous site reconnaissance in May, 1988. The Chicago River frontage was not thoroughly scanned using EM because of excessive electrical interference from the sheet piling and their associated tie-backs.

The EM technique uses an induced electromagnetic field to measure the conductivity response of the subsurface. A transmitter and receiver coil attached to a central meter allow the EM device to effectively measure changes in ground conductivity to depths of approximately 18 feet. The conductivity meter reading essentially provides a composite, integrated measurement of subsurface conductivities down to a given sensing depth.

The principle upon which EM data interpretation is based is that different materials may exhibit differing, characteristic electrical conductivities; fill and waste material conductivities may differ uniquely from natural soils. Metal objects exhibit a strong conductivity response. However, a conductivity high may not be exclusively characteristic of a buried metal object, but rather an indication that some unknown highly conductive materials, may be present below the ground surface.

Considerable ambiguity in interpretation may also occur due to nearby sources of electrical interference. Several potential and known sources of interference on site include: metal debris, conductive waste and reinforced concrete floor slabs and fill materials, sheet piling, fence lines and buildings. The effects of some of these materials can be noted during the survey, while the effects of buried materials can only be predicted if their locations are known or revealed through subsequent explorations.

Survey data was recorded using a fixed 25-foot by 25-foot grid pattern across DuSable Park. The data was later electronically transferred to a VAX computer. The EM data was contoured using a commercially available contouring program. Contour diagrams are generated on the computer by interpolating between the actual survey data points. The resultant iso-conductivity lines are interpolated estimates of subsurface conductivity and do not imply that data was collected at points other than the original field survey positions.

Subsurface Exploration and Sample Collection

The purpose of the subsurface exploration program was to observe location specific soil conditions and analyze selected samples for specific pollutants. The subsurface exploration program for this project consisted of:

- four "deep" borings. each to a depth of 15 feet below grade, conducted February 16 and 17, 1989

- six "shallow" borings, each to a 6-foot depth, conducted February 16 and 17, 1989

- two surface grab samples from between 0 and 2-foot depth, conducted February 16 and 17, 1989

- two Chicago River, Canal and Basin borings each to a depth of 10 feet below river bottom. conducted March 11, 1989

- four surface grab samples for asbestos, collected February 20, 1989.

The boring locations were selected based on the historical background review and site walkover observations, and for the DuSable Park parcel, an interpretation of the EM results. The soil boring locations are identified in Figure 1 in Appendix 1 of this report. The locations of the boring were proposed by STS, and after consultation with the Chicago Dock and Canal Trust, were staked in the field by a representative of STS. The boring logs, which contain descriptions of the materials, ground water levels and environmental conditions observed at each boring location, are also included in Appendix 5 of this report. Ground surface elevations were not established during field work.

Additionally, two ground water monitoring wells were installed in "deep" borings B-1 and B-8, on DuSable Park and the river frontage respectively. The wells were constructed of a 5-foot long, 2-inch diameter PVC well screen installed below the

water table observed while drilling. Monitoring well construction diagrams are included in Appendix 6 of this report. The wells were developed through bailing and water samples were collected on February 20, 1989.

The soil borings were performed with a truck-mounted auger drilling rig. The borings were advanced with the use of continuous flight solid stem augers. Representative soil samples were obtained in the borings utilizing the split-barrel sampling procedures and were performed in accordance with ASTM Specifications D-1586. Copies of the ASTM Specifications are enclosed at the back of this report. Soil samples in the deep borings were obtained at 2.5-foot intervals to a depth of 15 feet. In the shallow borings, one soil sample was collected between 5 and 7 feet and auger cuttings were observed for indications of contamination. The soil sampling device was cleaned between soil samples and the augers were cleaned between borings to minimize the potential for cross contamination. All boreholes, except B-1 and B-8 in which wells were subsequently installed, were grouted upon their completion. All samples were returned to the STS Northbrook office for further analysis and testing.

Analytic Testing Program

Boring, river sediment and surface soil samples were collected and sent to a subcontract laboratory retained by STS. In accordance with the chemical testing specifications, each sample was tested for:

- EP Toxicity Metals (8 RCRA)

- Volatile Organic Compounds (VOC)

- Base/Neutral Extractable Compounds, including polynuclear aromatic hydrocarbons (PNA)

- Acid Extractable Compounds, including semi-volatile organic compounds (SVOC)

- Polychlorinated biphenyls (PCB)

- Pesticides

- Cyanide

- Inorganic non-pollutant parameters including: chloride, sulfate, pH, total calcium, phosphorous, potassium, Kjeldahl nitrogen, and total solids.

Additionally, four surface soil samples were tested for asbestos. Because one of the four samples subsequently tested positive for asbestos, an additional six soil samples were collected in proximity to the original asbestos positive sample from the southern fill pile on DuSable Park.

The samples were also screened at STS's Northbrook, Illinois laboratory for volatile organic vapors using an HNu Model PI-101 photoionization detector. The HNu detector is capable of detecting VOCs having volatilization energies less than 10.2 eV. This type of device is sensitive to contaminants such as solvents and fuel vapors, but cannot diagnostically identify specific compounds.

Analytical testing results from the earlier, May, 1988 site reconnaissance on DuSable Park were also reviewed and included in this report.

HISTORICAL AND BACKGROUND REVIEW

The present day Chicago Park District Dedication parcels were once a part of Lake Michigan until initial Chicago Harbor development extended two piers out into the lake during the 1830's. Pier construction, channel dredging and redredging proceeded off and on during the mid-1800's in response to the persistent deposition of sand bars in and around the harbor and the need to keep the harbor open for commerce. A consequence of the pier construction was that natural Lake Michigan sedimentation processes filled the site area with sand; as the beach sand and possibly harbor dredging spoils accumulated, the site slowly emerged as land. With the installation of wood piles and other necessary dock fixtures, the site began its rapid growth as a commercial shipping center. Sometime after 1860, rail lines were extended onto the site, and the Michigan Canal (Ogden Slip) was constructed.

Early site photography from 1880 (circa) and historical maps from the 1880's show the site as a major freight transfer hub for the City of Chicago. DuSable Park was an active lumber and coal yard. Small wood buildings were scattered over the site, a light house was located near the present day Lake Shore Drive west bridge abutment, and rail lines extended along E. North Water Street to the end of DuSable Park. Larger warehouse buildings with riverside docks were located along the western third of the river frontage study area.

The Sanborn, Rascher, Robinson and Greeley Carlson Fire Insurance maps from 1886 through 1905 and The Chicago Dock and Canal Trust tenant records similarly illustrate site usage as mainly for raw material and general freight storage and transfer; companies operating the site areas are identified as coal, fuel (assumed to mean coal) and general freight warehouses. DuSable Park does not appear to have

had any major structures on site until sometime during the late 1920's. It appears to have been used mainly for coal storage until paper recycling operations were established on DuSable Park between 1930 and 1950.

Between 1891 and 1905, manufacturing facilities on parcels adjacent to the the study site included a coated paper plant, and a marble cutting house. Other nearby tenants included several syrup and candy factories.

Site tenant records from the 1920's show the southern half of DuSable Park occupied by a coal company while the northern half was part of a paper recycling mill. A building associated with the paper recycling facility may have been located near the northwest corner of present day DuSable Park based on the 1949 Sanborn maps and aerial photography. The paper recycling mill later became part of the Container Corporation of America's plant, which occupied a large area along Ogden Slip to the west and north of the project site. In the 1920's, the eastern half of the Chicago River frontage was vacant, and later used for coal storage during the 1930's. The western half of the river frontage was still occupied by several docks and warehouses, which later became the Chicago Tribune's dock and warehouse.

The 1949 Sanborn maps indicate a similar composition of businesses on site, including freight houses, and the Tribune Company warehouse. By that time, the entire project site was operated by the Container Corporation. The storage of raw materials, such as coal, sand and gravel were still concentrated on the eastern half of the river frontage and DuSable Park.

Land use atlases and chronological topographic map information from the 1940's through the 1970's appear to corroborate the inferred usage of the project site as a freight and raw material storage area with paper recycling mills on adjacent

parcels and a portion of DuSable Park. Aerial photography of DuSable Park from the 1970's appears to show exposed building foundations of concrete fill piles along the north half, possibly the remains of the paper recycling facility.

The last two decades have witnessed the closure and demolition of the only significant structure on the study site, the Tribune Dock and Warehouse along the Chicago River frontage in 1983. Both study parcels have probably been used intermittently for parking as well. Until recently, the City of Chicago utilized the property directly north of the Chicago River frontage parcel for municipal road salt storage. Road salt is sometimes found to contain trace contaminants such as arsenic and cyanide particularly if treated with anti-caking compounds. Down-gradient soil samples were tested for these compounds. While chloride is not considered a hazardous waste, high chloride levels may be phytotoxic to landscaped plantings and corrosive to steel and concrete structures.

Contamination on site, if present, would be expected to originate or be concentrated in the fill on site. However, the presence of significant contamination appears unlikely given the history and observed composition of the fill on site. The filling of the site up to its present grade was apparently the result of several episodes of material accumulation beginning with the natural deposition of sand bars and beach sand. Chicago Harbor and channel dredging spoils were possibly placed on site and graded; the dredged material probably consisted of clean lake sand. With the increased usage of the site for commerce, cinders, coal, wood, and rubble from on-site building demolition probably augmented the surface grade. It has been reported that charred debris from the Chicago Fire was also deposited on site. From the 1890's through the 1960's, additions to the fill on site came mainly through the demolition of buildings on site; structures were razed and regraded either into their former basements or above their foundations. The most recent addition to the fill on site occurred during 1986 and 1987 when

acceptable building demolition rubble, sand and gravel were placed on DuSable Park for future construction work on the park. Only acceptably clean fill material, which was screened by STS, was placed on DuSable Park; the fill material consisted of residual demolition fill from adjacent Chicago Dock and Canal Trust properties and excavation fill from other nearby downtown Chicago construction projects. Based on our explorations on the Chicago Park District Dedications and on surrounding properties, the observed fill materials appear to consist mainly of sand, gravel and building demolition waste with no indications of potentially hazardous waste materials such as sludges or buried chemicals.

Although no evidence of significant environmental degradation of the property was noted during the environmental reconnaissance and site sampling, the prolonged use of the site for industrial and commercial shipping. It can be expected that some hazardous chemicals were used, stored and transported on the study properties. It is likely that past tenants used solvents, petroleum products and other organic hydrocarbon products in their operations. It is possible that some wastes were disposed on site, in floor drains and/or in the sanitary sewer system, although available data show no evidence of such practices. Large volumes of hazardous chemicals were probably not used because of the nature of the dominant industries on adjacent parcels. Based on the historical review, there did not appear to be any significant hazardous chemical storage, transfer or disposal areas on site, such as lagoons, chemical tanks or waste piles. It must be emphasized that based on the available information from this reconnaissance, there was no documentation indicating that hazardous chemicals were used on site.

The railroad lines, coal burning furnaces and coal storage usage accounts for the abundance of coal and waste cinders observed in the fill material on site. Coal combustion products may contain contaminants such as VOCs and PNAs. Since it appears that much of the surface fill on site near the Chicago River is comprised

of rubble derived from the buildings which once stood here, it is possible that some asbestos may be present in the fill, although no asbestos was visually observed during the walkover reconnaissance.

Figure 3 in Appendix 3 of this report illustrates the locations of all registered hazardous waste facilities in the 60611 Postal Zip Code area. The computer listings for these sites for 1988 and 1989 are also included in Appendix 4. Review of USEPA CERCLA/Superfund sites, TSDS (Treatment, Storage, Disposal Sites) and RCRA Generator facilities lists for 1988 and 1989 did not identify the subject property as having any adverse environmental history. Mr. Richard Finley, district officer for the IEPA, stated that he had no knowledge of any past or current environmental allegations or investigations of environmental conditions in the vicinity of the Chicago Park District dedications.

Review of the IEPA RCRA Generators list did not identify the site as having a history of hazardous chemical usage, although the RCRA listing requirements are a relatively recent regulatory hazardous chemical tracking measure. The closest current RCRA listing is the Revere Sugar Corporation plant at 330 E. North Water Street, several hundred feet northwest of the river frontage. The Revere Sugar plant no longer exists on site, and its RCRA listing may be obsolete. Several other nearby, but more distant off-site, properties were identified as RCRA generators. RCRA generators are licensed operations which use, store or generate hazardous and/or toxic materials. RCRA generators include many manufacturing and industrial companies, car dealerships, schools, dry cleaners, and even some bridges over the Chicago River.

The closest CERCLA site (Superfund) is a Commonwealth Edison sub-station near Division and Halsted streets. The project site is not listed on the 1988 proposed or final National Priority List of Superfund sites, determined by the USEPA. There is only one TSDS Site listed in the 60611 Postal Zip Code Area, several blocks to the northwest.

Prior use of underground storage tanks (UST) around and possibly on site is considered possible, to store large volumes of fuels, gasoline or other industrial liquids. It is not known whether any of the businesses surrounding the project site had any UST on the survey parcels and/or whether, if present, the UST were eventually abandoned or removed. No indications of UST, such as fuel pumps, vent or fill pipes, or oil stained soils, were observed during the reconnaissance. The Office of the State Fire Marshal was contacted to determine whether any underground storage tanks were registered along any of the street addresses within the site boundaries. The Office of the State Fire Marshal indicated they they did not currently have any record of underground storage tanks registered at either of the study parcels.

On-Site Walkover Reconnaissance

A site walkover was conducted to observe existing site conditions. Selected photographs of the project site are included in the appendix to this report. The site did not have any structures besides Lake Shore Drive, which bisects the site, and a few remnants of the actual Tribune Company Dock. Excavation work on site during March, 1988 exposed what appeared to be the floor slab of the Tribune Warehouse and Dock on the western half of the river frontage. A few of the old dock mooring posts are present along the frontage.

There was only sparse vegetation, mainly concentrated along the margins on the two project study parcels; the vegetation included occasional swaths of grass and bushes, and trees on DuSable Park. Because of the winter conditions during the site walkover, observations regarding stressed vegetation could not be made. Much of the exposed ground surface appeared to be a heterogeneous fill comprised of soil, sand, gravel, cinders, asphalt grindings, brick fragments, crushed limestone, wood, and organic material. Miscellaneous windblown rubbish and bottles were scattered throughout the site at the time of the site walkover.

DuSable Park was covered by sand, gravel and fill materials, which were placed during 1986 as a precursor to proposed development on site. The fill was observed to be a heterogeneous assemblage of sand, gravel, clay, brick fragments, cinders, coal, wood, concrete, and asphalt. These fill materials are apparently recent products of demolition and excavation, although they may contain remnants of historical fill debris. Cinders, coal and large timbers were observed on the surface along the southern margin of DuSable Park. The Chicago River frontage parcel had small piles of miscellaneous rubble fill, concrete and steel construction debris along its margin. The upper fill over the western half of the river frontage included asphalt grinding waste; the asphalt grindings were placed there by the City of Chicago after the recent removal of salt-contaminated fill from the shallow subsurface of the parcel immediately north of the frontage.

Adjacent parcels were vacant, while the more distant project area is comprised by residential and office high rise buildings, night clubs, street level businesses, and parking lots and garages. No documentation of the environmental conditions on these properties was available during this reconnaissance.

There were no areas on site where hazardous waste dumping or the effects of contamination were noted visually. No fill or vent pipes, indicative of underground storage tanks were observed. However, such structures, if present, may have been positioned below a protective concrete pad, existing building foundations or are now obscured by fill. No indications of underground storage tanks were observed at the DuSable Park EM anomaly locations at the time of the drilling operations.

EXPLORATION RESULTS

Electromagnetic Survey

The results of the electromagnetic (EM) terrain conductivity survey across DuSable Park are presented in Figure 2 in Appendix 2 of this report. The figure illustrates EM conductivity contours superimposed on a site map. In general, the range of conductivity values [from 40 to 200 millimhos per meter (mmhos/m)], is high compared to terrain conductivity values commonly observed for natural soils; the observed conductivities, however, are not uncommon for rubble fill in an urban area. Natural soils typically exhibit a range of conductivities between approximately 5 and 40 mmhos/m.

Several high conductivity zones on DuSable Park probably indicate the presence of buried metal objects. An interpretation of the EM results cannot distinguish between different buried metal objects. However, the size and shape of an anomaly can be partially diagnostic. The large conductivity high zones may be attributable to buried steel-reinforced concrete building foundations, more conductive rubble fills, or other buried metallic debris. A few of the smaller conductivity anomalies may be caused by above ground or near surface steel debris or even utility conduits. It is possible that some of the EM anomalies are caused by underground storage tanks. However, this possibility seems unlikely given known site usage. Further exploration or additional site historical information would be required to assess this possibility.

Subsurface Exploration Results

The results of the soil borings show, as predicted, a fairly consistent two-layered stratigraphy across the site, consisting of a veneer of rubble fill over beach sands or clayey sand. Figure 1 in Appendix 1 of this report illustrates the boring, monitoring well and soil sampling locations for both the March, 1989, and May, 1988 environmental reconnaissance. Copies of the boring logs are included in Appendix 5 of this report. The boring logs for the deep (15 feet) borings and river borings describe several constituents observed to comprise rubble fill in the boring samples. Boring logs for the shallow (6 feet) borings were not prepared because only the one 5 to 7-foot sample was collected from each shallow boring location. The materials observed in the auger cuttings were similar to those documented in the deep borings and noted at ground surface.

The composition of the fill materials observed in all the borings was a mixture of sand, gravel, coal cinders, bricks, concrete, wood, and organic material. While distinct layers of more homogeneous fill materials were observed occasionally in the boreholes, thin, distinct strata of cinders, coal, and rubble fill could not be correlated across borings. The underlying strata consisted of either: 1) a beach sand, with poor to well sorted, fine to medium sand with thin gravel lenses, or 2) a clayey sand and sandy clay with thin sand lenses. Occasionally, trace amounts of black organic material were observed mixed in with the sand. The river borings encountered miscellaneous fill materials, similar to those observed on land, followed at depth by a silty clay with trace sand and gravel.

A strong organic odor was noted in boring B-8 on the river frontage at approximately 5 to 7 feet, just above the observed water table. HNu volatile organic vapor scans of the boring samples measured VOCs in sample S-3 at 70 parts per million (ppm), and S-4, S-5, and S-6 at 1 ppm. Because the measured value of

70 ppm may indicate potential volatile organic compounds in the soil (VOCs). Sample S-3 was retained for chemical analysis, including testing for VOCs. The results of that analysis are discussed in the following section of this report. No other boring samples had HNu detections above the detection limit.

Water table levels while drilling were noted between 7 and 10 feet below ground surface. The lower sand stratum tended to be wet to saturated. Water levels measured in the monitoring wells are noted on the well installation diagrams in Appendix 6 of this report. Chicago River water table levels in this area are known to fluctuate 1 to 5 feet on a daily, seasonal and long term basis. The fluctuating water levels and the high porosity of the sands and overlying fills may aid in flushing soluble and leachable contaminants out of the subsurface and probably toward the Chicago River and harbor or promote infiltration of local sewers.

Analytical Testing Results

The analytical testing results for the 16 samples, presented in Appendix 12 of this report, did not detect pollution levels which would be classified hazardous according to regulatory agency criteria and standards. The May, 1988 testing results are also included in Appendix 12.

Consistent trace level detections occurred in the analyses for VOCs and PNAs. VOCs, including benzene, toluene, and ethylbenzene (BTE) and other compounds, were observed at trace levels in most of the soil and sediment samples tested. The BTE concentrations ranged between a high of 0.22 ppm (for benzene in B-3) to non-detectable levels. Most BTE detections were in the trace 0.10 ppm to 0.01 ppm range. BTE are constituents of fuel oils and gasoline and are not uncommon at low part per billion concentrations in urban areas. Among the other trace VOC detections are several common solvents and degreasers, such as 1,1,1

trichloroethylene, 1.2 dichloroethane, and tetrachloroethylene, observed at levels from 0.30 ppm to undetectable. The methylene chloride detections were not considered significant as methylene chloride is often erroneously detected because of its wide use in laboratory procedures.

Several base/neutral compounds, a majority of which were PNAs, were similarly consistently detected in most of the samples tested. Most of the detections were in the low part per million (ppm) range (0 to 10 ppm), and one boring sample, B-3, identified a base/neutral compound as high as 35 ppm. It is common to observe low levels of base/neutral compounds, particularly PNAs, in urban fill areas, especially in areas where cinders and coal were stored and/or disposed. Other sources of PNA contamination in urban setting include heating oil and diesel fuel contamination. No detectable VOCs or PNAs were observed in the two groundwater samples, MW-1 or MW-2.

None of the levels of VOC and PNA detections would categorize the samples tested as hazardous waste. There is, however, some limited potential that these contaminant levels would qualify the fill as a "special waste", a separate classification applied by the IEPA. A more complete discussion of the implications of these findings is included in the analysis section of this report and in Appendix 14.

No PCBs, pesticides or cyanide were observed above laboratory detection levels. EP toxicity levels of barium were identified above laboratory detection levels for most of the samples tested. A few other metals, including lead and mercury, were detected slightly above the LDL in a few of the samples tested. All metal concentrations were one to three orders of magnitude below USEPA RCRA guidelines for hazardous waste classification, which are listed alongside the metal analytical testing results. Low levels of metals were also observed in the earlier

environmental reconnaissance testing on Point Park. The low levels of the metals and their even distribution suggest the measured levels represent background levels in the fill materials throughout the Chicago Park District Dedication property.

Moderate chloride and sulfate levels were observed in several of the samples tested. However, these compounds in soils are not currently significant to regulatory agencies, except for drinking water quality assessments. The pH of the samples tested showed a tendency towards alkaline conditions, but at levels well below regulatory levels.

The sensitivity of the analytical test results is measured by the laboratory's ability to detect specified hazardous substances at or above a detectable concentration. This laboratory detection limit represents a chemical concentration that the laboratory can identify with a reliable degree of accuracy. Substances identified as present but below their specific detection levels are not reported since the analytic accuracy cannot be assured. Most detection limits are far below contaminant concentrations deemed significant for regulatory actions.

Asbestos Testing

Four surface grab samples were bulk tested for the presence of asbestos using polarized light microscopy. Only sample A-3, from the southern half of the DuSable Park fill pile, detected asbestos at a level of 2% of the sample. Retesting of this sample confirmed this result. Based on this finding, an asbestos consultant was retained to collect six additional grab samples from DuSable Park in the vicinity of A-3 and test them for asbestos. The results of supplemental testing did not detect any asbestos in the six samples tested. It appears that the asbestos detection in sample A-3 was isolated and is not typical of the materials in the fill pile. The results of the initial and supplemental asbestos testing are included in Appendices 15 and 16.

ANALYSIS AND RECOMMENDATIONS

The results of the environmental reconnaissance on the Chicago Park District Dedication parcels did not document or visually observe significant environmental degradation on site. While trace levels of several organic pollutants were detected in the fill materials and river sediments tested, the presence of these compounds should not significantly impact future development or proposed use of the site. Several potential historical sources of chemical impairment of the subsurface were noted.

The phased exploration approach utilized for the site reconnaissance consisted of successive study steps exploring and analyzing suspected areas and potential compounds which may have resulted in environmental degradation. In general, for the samples analyzed from the property, trace or non-detectable levels of contamination were measured. While the levels of contaminants detected should not present an exposure hazard, several precautionary, remedial measures are recommended given the intended public usage of the site. Current Esplanade and DuSable Park plans should be reviewed to document that the potentially impacted fill materials are sufficiently covered to adequately isolate the existing soil conditions from future public exposure. Additionally, the excavation spoil from any construction activities should be managed as appropriate, considering the potential for environmental impairment.

A comprehensive review of available information did not identify any incidents of actual or alleged contamination on site. The results of the background search and exploration results did identify several potential sources of environmental contamination. It should be remembered that the potential sources of environmental degradation, such as the presence of underground storage tanks and hazardous waste

storage on site, are speculative as they were based on a review of available site information and observations of present conditions; no known subsurface explorations, including those completed for this project, have documented these threats.

Among the potential sources of contamination on site are: the cinder fill material, improper handling and disposal of hazardous chemicals on site by former industries on adjacent sites, abandoned and leaking underground storage tanks on adjacent sites, subsurface contamination from adjacent properties migrating on-site, and contaminated Chicago River sediments migrating on-site. The last potential threat is considered less likely since groundwater movement on site is probably towards the surrounding waterways, whereby any on-site contamination may actually be discharging off site and into the Chicago River. Deep building foundations, and shallow, highly porous fill, sand, and gravel on and in the vicinity of the site may be conduits for contaminant migration into groundwater. It is unlikely that groundwater is used for drinking in this area.

The records received from the IEPA and USEPA did not indicate that this site was a permitted hazardous waste generator, transfer station, or CERCLA Superund site. Several companies within a one-mile radius were listed as RCRA generators. No underground storage tanks were registered at this location.

Adjacent site usage which mainly consisted of paper recycling, candy manufacture, and warehousing could potentially contribute to subsurface contamination. However, this potential is too tentative to assess based on available information. Finally, recent project experience in the downtown Chicago area has found that coal and cinder fill, both common fill materials in the site vicinity and near the old rail

lines can be a source of VOC and PNA hydrocarbons. The levels of these pollutanats are typically in the same range as observed in analyses of the samples for this project.

A review of the analytical testing results for the 16 samples tested on site and in the Chicago River showed low levels of two categories of organic pollutants. VOCs and PNA hydrocarbons were observed consistently in the soil samples. No VOCs or PNAs were detected in the groundwater samples. All of the measured contaminant levels are less than OSHA recommended exposure standards. While none of the levels of the pollutants detected in the samples tested would qualify the fill material on site as hazardous waste, the presence of these contaminants may indicate that this fill material (except possibly B-2) would be classified by IEPA as a "special waste", based on current interpretation of regulatory agency guidelines. The IEPA as of yet has not developed a specific standard for low level contaminated fills in urban areas other than for specifically fuel contaminated soil and water. In lieu of a specific standard, the IEPA has employed their Generic Fuel Clean-Up Objectives (GFCO) as their standard for categorizing such material as special waste when a specific source of the contaminant is present. A copy of the GFCO is included in Appendix 13 of this report. Additionally, any material excavated from a closed "dump" site would also be classified a special waste. This recently enacted law (January, 1989) is still being interpreted and is discussed further in Appendix 14.

Several heavy metals were detected in the samples tested, but at levels below those which would designate the material as hazardous waste. The hazardous waste classification standard for lead and silver is 5 ppm and that for barium is 100 ppm. The levels of these metals detected in the samples were one to three orders of magnitude below this standard. The low levels of these metals and their even distribution may be a natural condition of the fill materials throughout the

downtown Chicago riverfront area. No PCBs, pesticides, or acid extractable compounds were observed above the laboratory detection level. Asbestos may be present in the fill materials on site in apparently localized low concentrations.

The low level PNA, VOC, and heavy metal detections suggest that these compounds may be present across the site. Concentrations of PNAs between 1 and 50 ppm and VOCs between 0.01 and 5 ppm in fill materials in the downtown Chicago area is not uncommon. There was no observable pattern in contaminant detections across the boring locations or sample depths. While all of the PNA, VOC, and metal compounds detected are considered regulated pollutants, there do not currently exist regulatory clean-up standards for these compounds in soil, such clean-up criteria are specified by the Illinois EPA on a case-by-case basis. It is likely that no remedial measures would be required since: 1) the observed contaminant concentrations are relatively low and not atypical for the area; 2) it would be very difficult to establish background criteria (uncontaminated soil chemistry) for comparison purposes at a site in downtown Chicago; and 3) it may be impossible to identify a specific source of contamination. The latter two conditions are required in most clean-ups. The implications of the presence of these contaminants is discussed further in Appendix 14 of this report.

Based on the available information collected and reviewed for this report, there does not appear to be any significant environmental conditions on site which would impair the proposed property development as public park and riverfront greenbelt space, given the current construction plans.

Recommendations

STS understands that the Chicago Park District Dedications will be developed into a riverfront esplanade and landscaped park. It is of some concern that public visitors to the completed park facility could possibly be exposed to the materials present in the fill on site. It should be noted that the trace levels of pollutants observed on site were all below regulatory agency (OSHA) exposure standards. Additionally, the Esplanade and DuSable park design plans will tend to further minimize the public's potential exposure to contaminants through the application of pavement or a topsoil cover across the site. The Esplanade design plans call for a paved walkway with above grade planters. Similarly, the perimeter of DuSable Park will have a paved walkway. The paved areas, with sufficiently thick subbase material, should provide adequate cover for these heavily trafficked areas isolating the public from any of the current fill material on site.

The greatest potential for exposure to fill materials would come in the landscaped central areas of DuSable Park. Currently, plans call for 2 feet or more of topsoil cover over the design grade. This cover should be adequate to limit public exposure to the fill below. If there are areas on site where the pavement subbase thickness or the topsoil fill thickness may be close to or below the design thickness, it may be desired to overexcavate and backfill with clean soil to allow for the placement of adequate minimum cover.

Based on the analytical testing results and detected levels of PNAs, some of the on-site soil and fill materials could qualify as special waste according to our understanding of current regulatory agency advisories, and could require the proper handling and disposal of these materials. The handling of special wastes involves properly manifesting the waste materials, and transporting and disposing of them at a licensed special waste landfill. In the past, site derived waste fill from this

general area has been handled as excavation spoil and construction debris and disposed in a regular landfill or other appropriate locations. Special handling and disposal of these materials has not been common construction practice. However, in the absence of explicit written guidance on this issue, our discussions with the IEPA appear to indicate that interpretation of the relevant regulations is still evolving and may eventually encompass how such construction wastes are treated. Further guidance regarding the handling and disposal of contaminated urban fills is contained in Appendix 14.

If excavations are to be performed on site, the removal and proper disposal of the excavation spoils is recommended to insure unequivocal compliance with current environmental regulations. If fill materials are to be excavated from selected areas on site, such as from the perimeter of DuSable Park, it is recommended these materials not be placed back in the excavation or regraded elsewhere on site; rather, the excavation spoils should be removed off site under manifest and disposed in a permitted special waste landfill.

The potential presence of contaminated vapors, soil, fill, and water, especially in locations where excavations, trenching or caissons are planned, is an important consideration when planning the appropriate worker health and safety protocol. If such development activities below ground are planned, STS recommends that periodic monitoring for the presence of hazardous compounds be performed. Persons or contractors involved in the subsurface construction activities should be made aware of the detected compound's potential presence so as to take appropriate monitoring and/or safety actions, if any.

General Qualifications

This report has been prepared to review the environmental conditions in order to assess the risks incumbent on the future development at this property. The studies performed are customarily recommended to commercial property owners as appropriate for this type of property. The assumptions, conclusions, and recommendations presented in this report are time dependent and are based on the available information reviewed, site observations, and location specific soil samples. Site conditions may vary between soil samples. The analyses by the analytical laboratories are assumed to be representative of the samples submitted for the testing parameters requested. Environmental conditions and available site information are subject to change and cannot be assumed to remain as reported herein at some time in the future. Environmental regulations and their interpretation are also subject to change and may be revised in the future.

This report represents our engineering judgments and opinions based on available data, and no warranty, either expressed or implied, is contained in this report.

REFERENCES

1880 - Present (approximate), Lessee Records for site, Chicago Dock and Canal Trust file information

1880 - Present (approximate), Aerial and site photography of project site, Chicago Dock and Trust files

1880 - (circa) Site photography, Chicago Historical Society

1884 - Andreas, A.T., History of Cook County, Illinois, A.T. Andreas, Chicago

1886 - Robinson's Atlas of Chicago, Fire Insurance Map, Reference map for available fire insurance surveys

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1891 - Greeley Carlson Fire Insurance Map, Reference map for available fire insurance surveys

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1902 - Geologic Map of Chicago Loop Quadrangle; United States Department of Interior, Geological Survey, 15 minute series (compiled 1897-1899)

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1949 - Sanborn Fire Insurance Map, Reference map for available fire insurance surveys

1963 - Topographic Map of Chicago Loop Quadrangle; United States Department of Interior, Geological Survey, 7.5 minute series

1970 - Chicago Land Use Atlas, City of Chicago, Department of Development and Planning

1972 - Topographic Map of Chicago Loop Quadrangle; United States Department of Interior, Geological Survey, 7.5 minute series (photorevision of 1963 map)

1973 - Aerial Photography of the site, Northeastern Illinois Planning Commission

1978 - Aerial Photography of the site, Northeastern Illinois Planning Commission

1983 - Aerial Photography of the site, Northeastern Illinois Planning Commission

1986 - Subsurface Explorations on site performed by STS on site

1987 - Subsurface Explorations on site performed by STS on site

1988 - Illinois Environmental Protection Agency (IEPA): CERCLA, TSDS and RCRA generator computer records

1989 - Illinois Environmental Protection Agency (IEPA): CERCLA, TSDS and RCRA generator computer records

1988 - United States Environmental Protection Agency, National Priorities List, Final and Proposed Sites, June 1988

1988 - Illinois State Fire Marshal's Office, phone conversation

1988 - Environmental Reconnaissance of site performed by STS on site

APPENDIX

1. Figure 1 - Site, Boring, and Sample Location Diagram

2. Figure 2 - EM Conductivity Contour Diagram of DuSable Park from Environmental Reconnaissance of May, 1988

3. Figure 3 - Hazardous Waste Facilities Located in U.S. Postal Zip Code Area 60611

4. Listings of CERCLIS, TSDS and RCRA Hazardous Waste Facilities in Postal Zip Code Area 60611 for 1988 and 1989

5. Boring Logs

   Environmental Reconnaissance, March, 1989
   Environmental Reconnaissance, May, 1988

6. Monitoring Well Installation Diagrams

7. General Notes

8. Unified Soil Classification System

9. Field and Laboratory Procedures

10. Standard Boring Log Procedures

11. Sampling Procedures

    ASTM D-1586-84

12. Analytical Chemical Testing Results

    Environmental Reconnaissance, March, 1989
    Environmental Reconnaissance, May, 1988

13. Illinois Environmental Protection Agency Generic Fuel Cleanup Objectives

14. Guidance Regarding the Classification and Handling of Low-Level Contaminated Urban Fill Materials

15. Asbestos Testing Results

16. Report of Supplemental Asbestos Survey of DuSable Park

17. Site Photography Documentation

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15. Asbestos Testing Results
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17. Site Photography Documentation

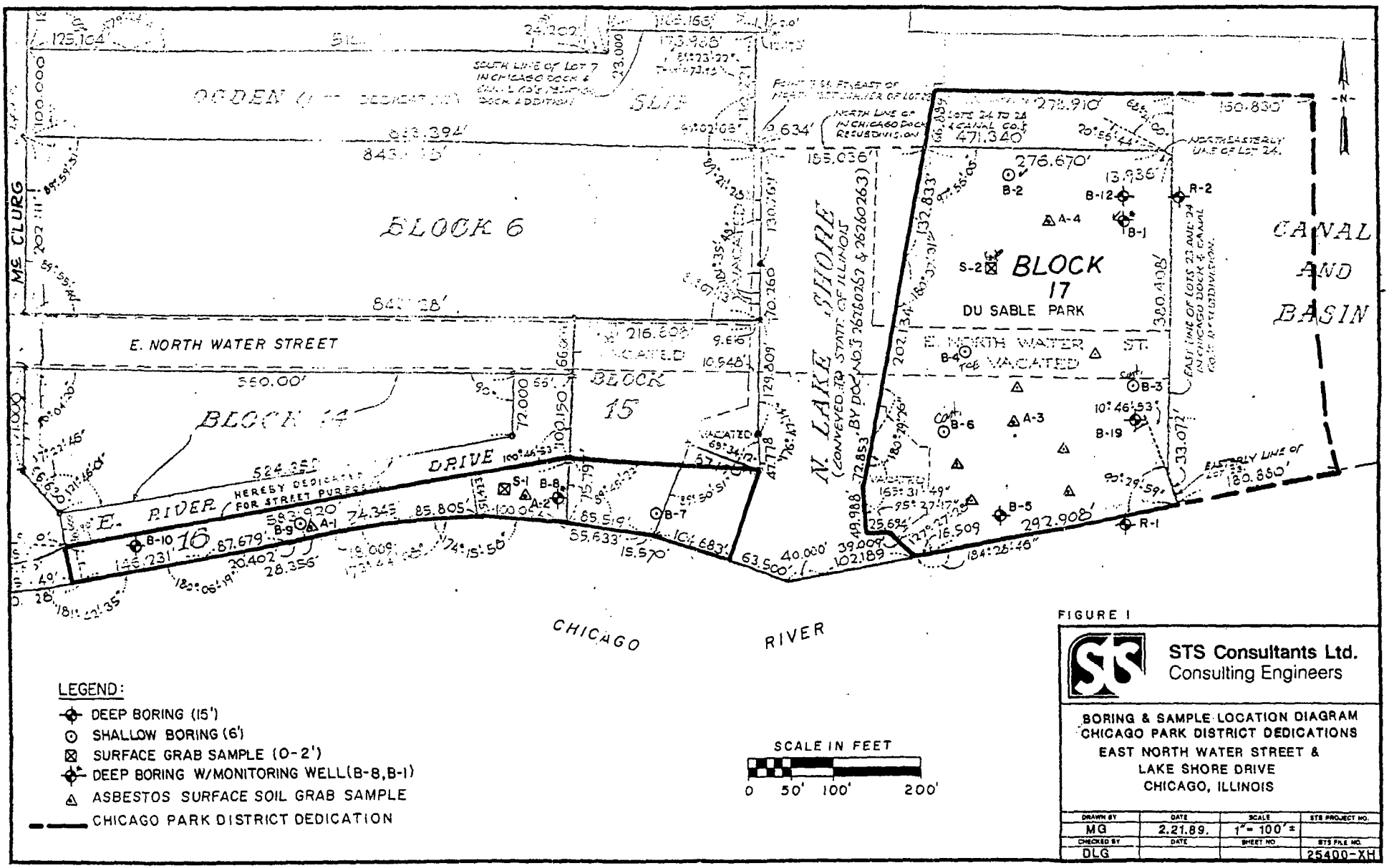
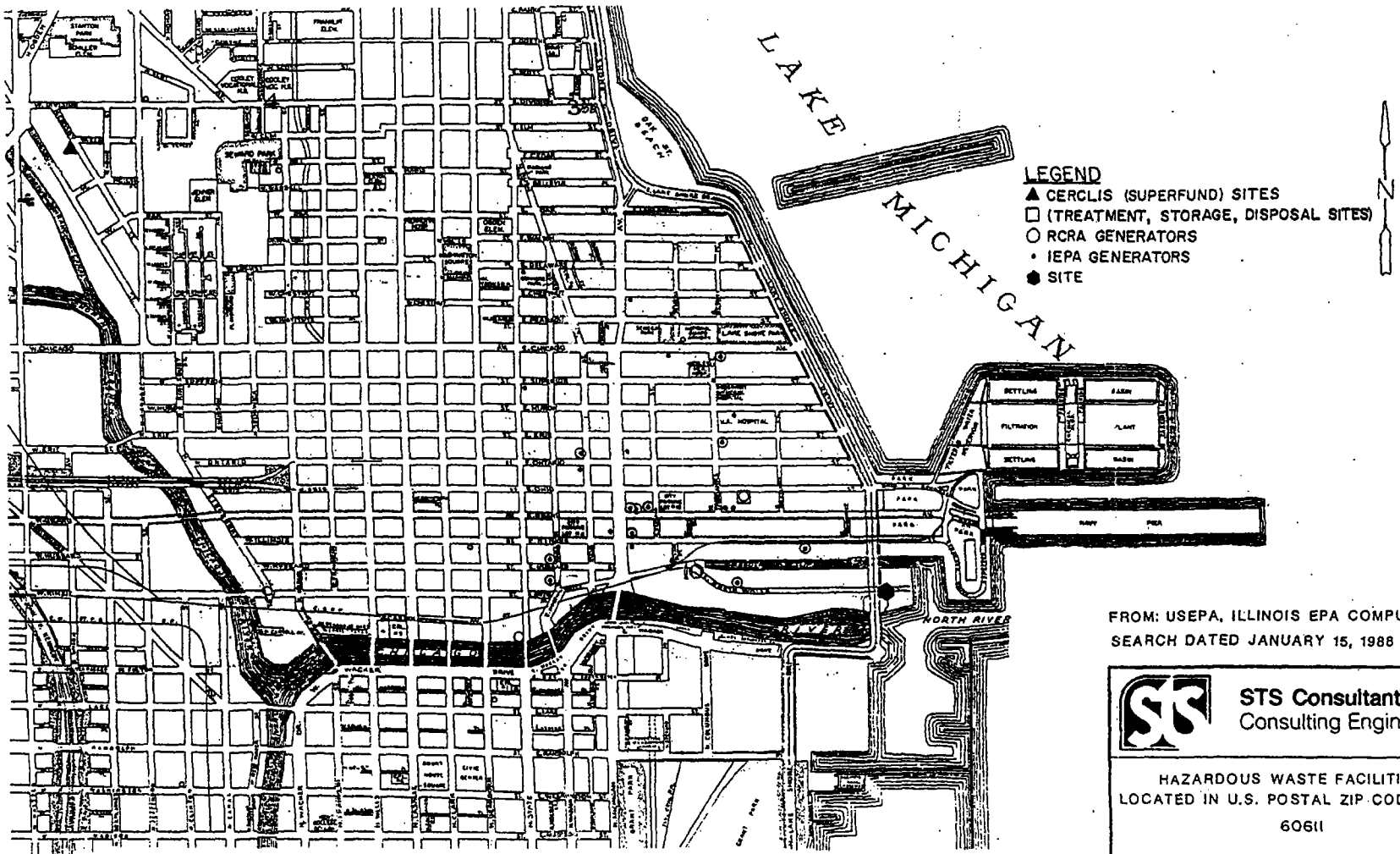


FIGURE 1

STS Consultants Ltd.
Consulting Engineers

BORING & SAMPLE LOCATION DIAGRAM
CHICAGO PARK DISTRICT DEDICATIONS
EAST NORTH WATER STREET &
LAKE SHORE DRIVE
CHICAGO, ILLINOIS

DRAWN BY	DATE	SCALE	STS PROJECT NO.
MG	2.21.89.	1" = 100' ±	
CHECKED BY	DATE	SHEET NO.	STS FILE NO.
DLG			25400-XH



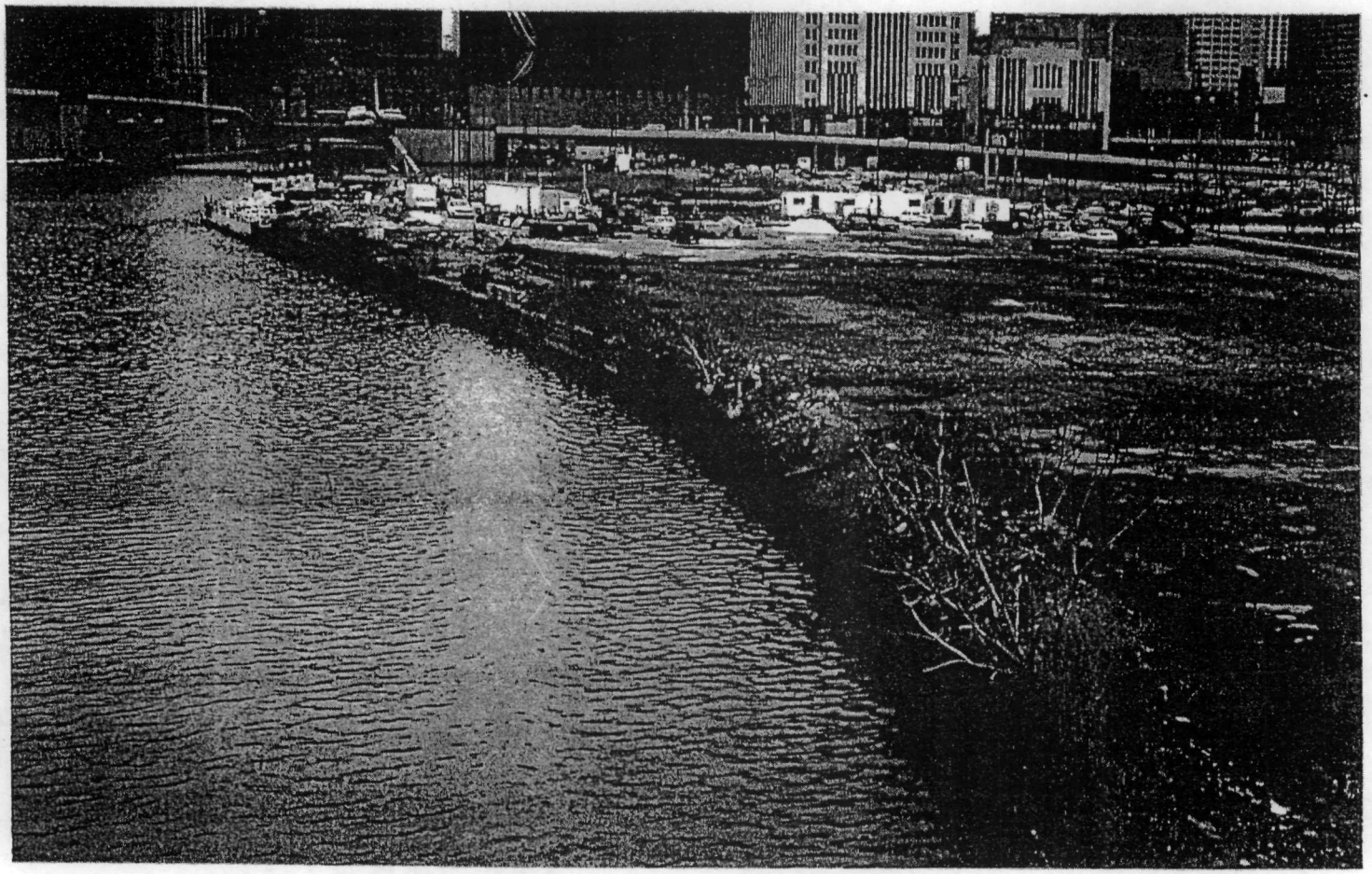
FROM: USEPA, ILLINOIS EPA COMPUTER SEARCH DATED JANUARY 15, 1988

STS Consultants Ltd.
Consulting Engineers

HAZARDOUS WASTE FACILITIES
LOCATED IN U.S. POSTAL ZIP CODE AREA
60611

DRAWN BY	DATE	SCALE	STS PROJECT NO.
GRS	4/14/88		25304-XF
CHECKED BY	DATE	SHEET NO.	STS FILE NO.

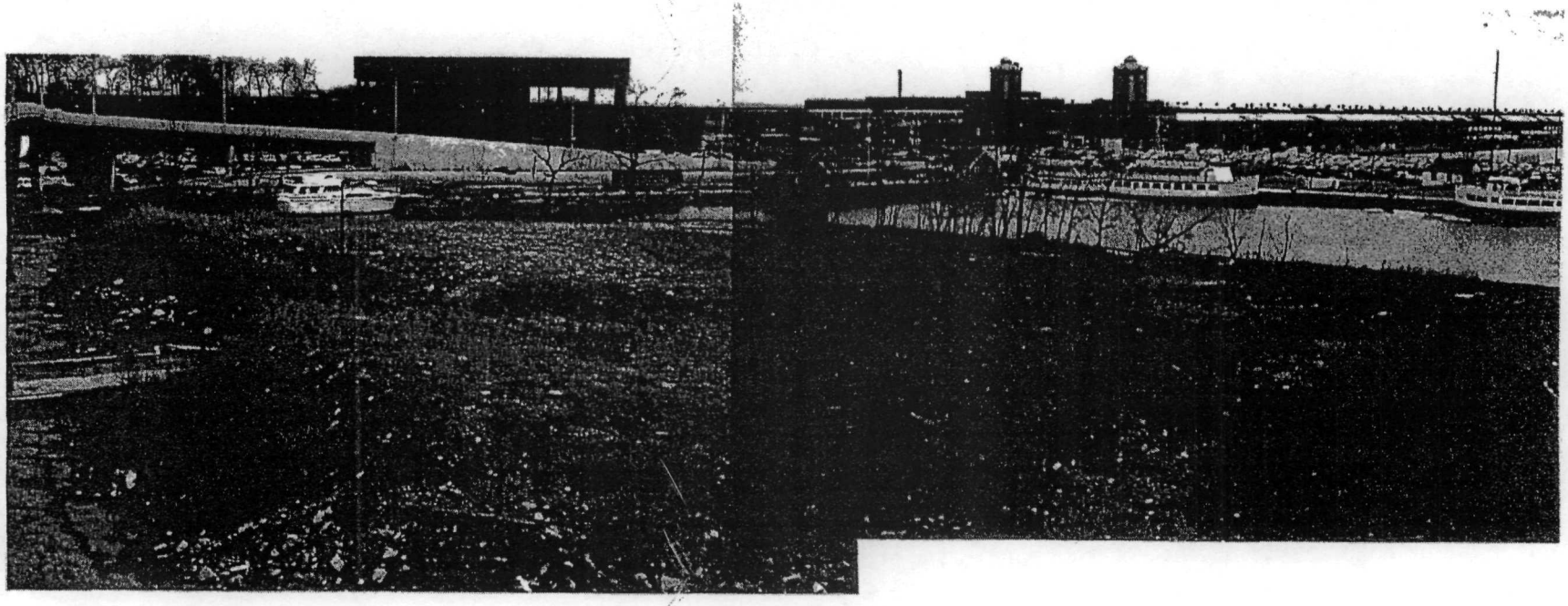
FIGURE 3



1. Chicago Park District Dedication, Chicago River frontage, looking west from Lake Shore Drive.

Photography by D. Grumman, March 15, 1989

STS Project No. 25400-XH



2. Chicago Park District Dedication, Point Park, looking northeast to east from Lake Shore Drive.

Photography by D. Grumman, March 15, 1989 STS Project No. 25400-XH

3. Rubble fill exposure on west face of Point Park fill pile near E. North Water Street, looking northeast.

Photography by D. Grumman, March 15, 1989

STS Project No. 25400-XH

BORING LOCATION AND EM CONTOUR DIAGRAM

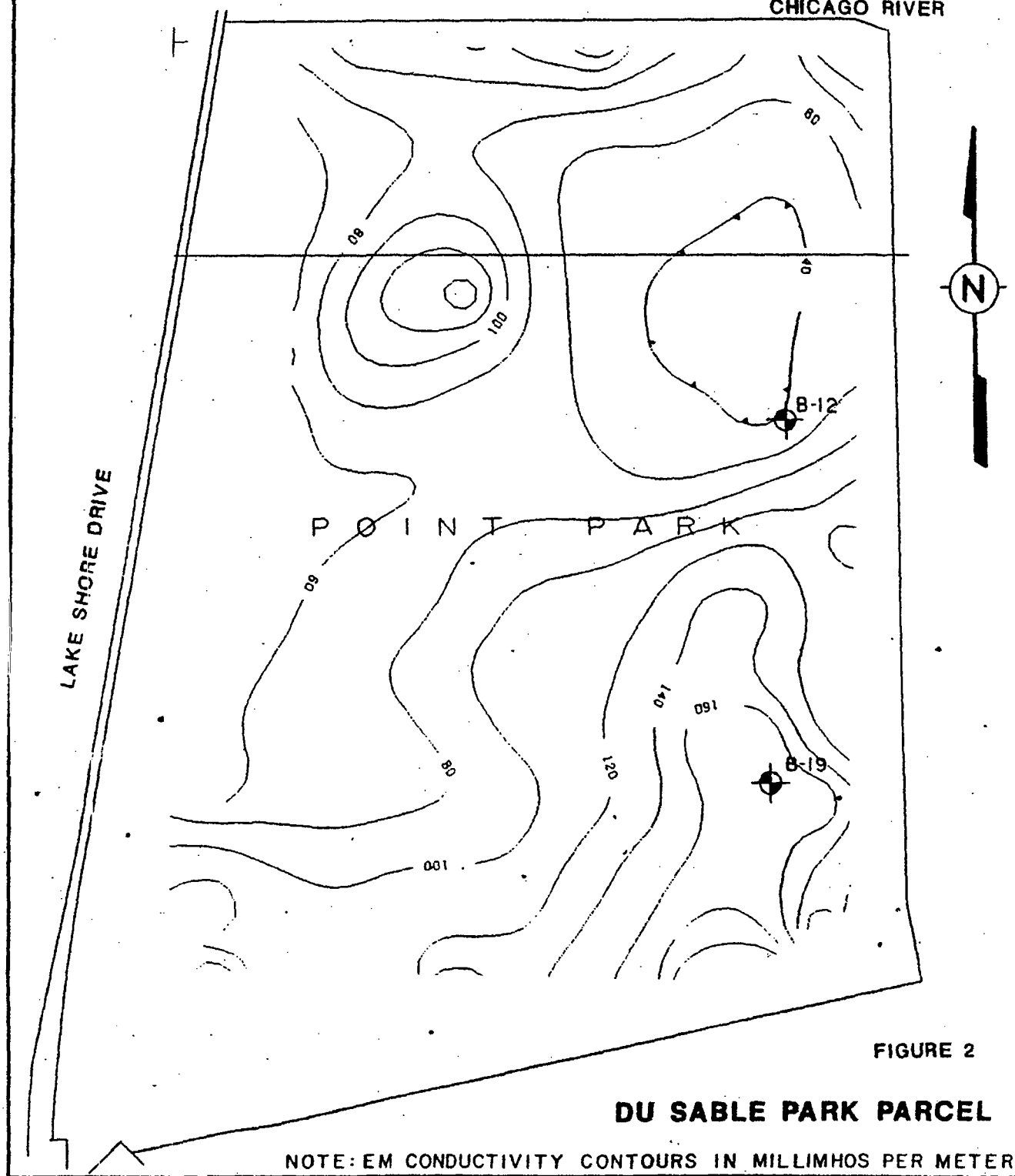


FIGURE 2

DU SABLE PARK PARCEL

NOTE: EM CONDUCTIVITY CONTOURS IN MILLIMHOS PER METER

STS Consultants Ltd.
Consulting Engineers

PROJECT/CLIENT

ENVIRONMENTAL RECONNAISSANCE

McCLURG CT. & ILLINOIS ST.
CHICAGO, ILLINOIS

DRAWN BY	KKB	
CHECKED BY		5-88
APPROVED BY	DLG	
SCALE 1"=60'	FIGURE NO.	
STS DRAWING NO.	25400-XF	

GENERATORS RUN FILE-FOIA.LINEITEM(GENZP)
88/01/15

# FACILITY NAME - CONTACT # PHONE	COUNTY FACILITY STREET CITY	ST	ZIP	ID# MAIL STREET CITY	ST	ZIP	CODE
***							
# BREGY CLEANERS	COOK			ILD049811953			
- BREGY ROBERT PRES	542 N ST CLAIR			542 N ST CLAIR			
# 3126443660	CHICAGO	IL	60611	CHICAGO	IL	60611	2
# BRITISH CONSULATE GENERAL	COOK			ILD981957459			
- FINNERTY KEVIN VC	202 N STREETER DR			33 N DEARBORN			
# 3123461810	CHICAGO	IL	60611	CHICAGO	IL	60603	1
# CHICAGO CITY OF STATE STREET DRAWBRIDGE	COOK			ILD980791693			
- VASONIS ARVYDAS CIVIL ENG	300 N STATE ST			320 N CLARK ST			
# 3127443335	CHICAGO	IL	60611	CHICAGO	IL	60610	1
# CHICAGO SUN-TIMES	COOK			ILD980620124			
- COLBERT WILLIAM ASST PROD MGR	401 N WABASH			401 N WABASH AVE			
# 3123212047	CHICAGO	IL	60611	CHICAGO	IL	60611	2
# COLUMBIA LABEL CORP	COOK			ILD001754837			
- HESELTINE FRANCES BOOKKEEPER	431 E ILLINOIS ST			431 E ILLINOIS ST			
# 3123274494	CHICAGO	IL	60611	CHICAGO	IL	60611	2
# DAWSON HANLEY CADILLAC CORP	COOK			ILD112551627			
- LEWIN SOL DIR OF PURCHASING	630 N RUSH ST			630 N RUSH ST			
# 3124407511	CHICAGO	IL	60611	CHICAGO	IL	60611	2
# EDIT CHICAGO VIDEO INC	COOK			ILD069478840			
- IIIC ANTHONY J MGR	160 E GRAND AVE			160 E GRAND AVE			
# 3122802200	CHICAGO	IL	60611	CHICAGO	IL	60611	1
# EDITEL CHICAGO	COOK			ILD062484936			
- SCHAUER RAY PURCHASING AGT	301 E ERIE ST			301 E ERIE ST			
# 3124402360	CHICAGO	IL	60611	CHICAGO	IL	60611	2
# KIEFFER-NILOE INC	COOK			ILD045687308			
- KIEFFER DONALD E PRESIDEN	160 E ILLINOIS ST			160 E ILLINOIS ST			
# 3123375500	CHICAGO	IL	60611	CHICAGO	IL	60611	1
# MIDWEST LAW PRINTING CO	COOK			ILD005450754			
- KOERNER PHYLLIS MGR	444 N WABASH			444 N WABASH			
# 3122210220	CHICAGO	IL	60611	CHICAGO	IL	60611	1
# NORTHWESTERN UNIVERSITY	COOK			ILT180011546			
- MILLER DAVID BIOHAZ SAFETY OFF	303 E CHICAGO AVE			633 CLARK ST			
# 3126988300	CHICAGO	IL	60611	EVANSTON	IL	60201	2
# OPTIFEX INC	COOK			ILD980903109			
- MADLLE JOHN GROUP MGR	444 N WABASH AVE			444 N WABASH AVE			
# 3126442764	CHICAGO	IL	60611	CHICAGO	IL	60611	1
# OPTIMUS INC	COOK			ILD062478516			
- SLOMINSKI GEORGE	161 E GRAND AVE			161 E GRAND AVE			
# 3123210980	CHICAGO	IL	60611	CHICAGO	IL	60611	2
# ROYCE SUGAR CORP	COOK			ILD096799646			
- CHARLES VRDA LAB MGR	330 E NORTH WATER ST			330 E NORTH WATER ST			
# 3125275594	CHICAGO	IL	60611	CHICAGO	IL	60611	2
# SANDOZ CROP PROTECTION	COOK			ILD980502314			
- PETERSON DARIN M DIR RES ADMIN	341 EAST OHIO STREET			341 EAST OHIO STREET			
# 3124704500	CHICAGO	IL	60611	CHICAGO	IL	60611	1

TSDS RUN FILE-FOIA.LINEITEM(TSDZP)
88/01/19

# FACILITY NAME - CONTACT = PHONE ***	COUNTY FACILITY STREET CITY	ST	ZIP	IDH MAIL STREET CITY	ST	ZIP	CODE
# SANDOZ CROP PROTECTION - PATTERSON DRWIN M DIR RES ADMIN = 3126704500	COOK 341 EAST OHIO STREET CHICAGO	IL	60611	ILD980502314 341 EAST OHIO STREET CHICAGO	IL	60611	1

CERCLIS SITES
01/29/1988

*** ID NUMBER	NAME	SITE LOCATION	CITY	ST	ZIP CODE	COUNTY NAME
*** ILD980606321	COMMONWEALTH EDISON NORTH STA	1122 N CROSBY ST	CHICAGO	IL	60611	COOK

* ILD980606305	DUPAGE COUNTY LDFL BLACKW ELL FOREST	RTE 56	WARRENVILLE	IL	60555	DUPAGE
* ILD060858155	NELSONS LDFL	GALENA & BEECHER RD	YORKVILLE	IL	60560	KENDALL
* ILD980020849	CLASSIC CHEM	1914 SO KILBOURN AVE	CHICAGO	IL	60602	COOK
* ILD081035867	STIFFEL CO THE	ADDRESS LENTHY SEE FILE	CHICAGO	IL	60603	COOK
* ILD981536063	HEATH & MILLIGAN	170 RANDOLPH ST	CHICAGO	IL	60604	COOK
* ILD981536071	HEATH & MILLIGAN	96 SEWARD ST	CHICAGO	IL	60604	COOK
* ILD982074726	NATIONAL LEAD CO FCTY #13	1516 SO STATE	CHICAGO	IL	60605	COOK
* ILD980607147	SHIPMAN D R WHITE LEAD CO	CORNER ST & 15TH ST	CHICAGO	IL	60605	COOK
* ILD046170577	FREEMAN UNITED COAL MININ G (SIA)	300 W WASHINGTON	CHICAGO	IL	60606	COOK
* ILD072348542	CHEMISPHERE INC STORAGE # 1	17 N MAY ST	CHICAGO	IL	60607	COOK
* ILD005163993	COMMERCIAL POLISHING & PL ATING CO	1223 W LAKE ST	CHICAGO	IL	60607	COOK
* ILD980704472	HEATH & MILLIGAN CO	787 S CANAL	CHICAGO	IL	60607	COOK
* ILD984766360	MAGNUS COMPANY INCORPORAT ED	4041 EMERALD AVE.	CHICAGO	IL	60607	COOK
* ILD005420651	WEST PULLMAN IRON & METAL	11954 SO PEORIA	CHICAGO	IL	60607	COOK
* ILD025022997	ACME BARREL CO	2300 W 13TH ST	CHICAGO	IL	60608	COOK
* ILT180014839	ACME REFINING	829 W 22ND PL	CHICAGO	IL	60608	COOK
* ILD044231650	AUGUST BATTAGLIA DISTRIBU TING CO	2545 S ASHLAND AVE	CHICAGO	IL	60608	COOK
* ILT180014722	BARKER CHEM CO	2500 S SEMOUR AVE	CHICAGO	IL	60608	COOK
* ILD981959216	CHICAGO CITY OF CYANIDE I NCIDENT	2642 SOUTH CALIFORNIA	CHICAGO	IL	60608	COOK
* ILD982074668	CHICAGO WHITE LEAD	1400 SO WESTERN ST	CHICAGO	IL	60608	COOK
* ILD980900880	GREAT LAKES LIMITED PARTN ERSHIP (SIA)	505 N LAKESHORE DR SUITE 606	CHICAGO	IL	60608	COOK
* ILD980902035	HARRISON PARK	18TH & DAMEN	CHICAGO	IL	60608	COOK
* ILD047907555	INSILCO CORP ENTERPRISE C O DIV	2841 S ASHLAND AVE	CHICAGO	IL	60608	COOK
* ILD982074767	PEOPLES GAS LIGHT & COKE	SO RACINE & CERMAK	CHICAGO	IL	60608	COOK
* ILD980606297	REILLY TAR & CHEM CORP	2513 S DAMEN AVE	CHICAGO	IL	60608	COOK
* ILD030901169	SOUTHERN WHITE LEAD CO	900 W 18TH ST	CHICAGO	IL	60608	COOK
* ILD984767780	STEARNS QUARRY	S HALSTED AND W 29TH ST	CHICAGO	IL	60608	COOK
* ILD005450697	CUSTOM ORGANICS INC	1445 W 42ND ST	CHICAGO	IL	60609	COOK
* ILD025022930	FISHER CALO CHEM CO	600 W 41ST ST	CHICAGO	IL	60609	COOK
* ILD005119995	HYSAN CORP	919 W 38TH ST	CHICAGO	IL	60609	COOK
* ILD980606339	J P REFUSE DSPL	40TH & S ASHLAND	CHICAGO	IL	60609	COOK
* ILD980606313	MAGNUS CO INC	2234 W 43RD ST	CHICAGO	IL	60609	COOK
* ILD981952906	STEWART ST ACID DRUM SITE	3720 SO STEWART	CHICAGO	IL	60609	COOK
* ILD005120498	WRIGLEY WM JR CO	3535 S ASHLAND AVE	CHICAGO	IL	60609	COOK
* ILD005192646	A-1 MULTIPLATE SERV INC	411 N MILWAUKEE AVE	CHICAGO	IL	60610	COOK
* ILD981536089	HEATH & MILLIGAN	1833 SEWARD ST	CHICAGO	IL	60610	COOK
* ILD982074775	PEOPLES GAS LIGHT & COKE NORTH STA	CROSBY & DIVISION	CHICAGO	IL	60610	COOK
* ILD980606321	COMMONWEALTH EDISON NORTH STA	1122 N CROSBY ST	CHICAGO	IL	60611	COOK
* ILD066204181	AFCO IND INC	2855 W LAKE ST	CHICAGO	IL	60612	COOK
* ILD070875285	LAKE SALVAGE CO	2527 W LAKE ST	CHICAGO	IL	60612	COOK
* ILD096790269	ACCURATE DIE & STAMPING C O DIV OF ALLIED	1947 N HAUD AVE	CHICAGO	IL	60614	COOK
* ILD005187802	COLUMBIA METAL SPINNING C O INC	1644 W WRIGHTWOOD AVE	CHICAGO	IL	60614	COOK
* ILD982074684	DIAMOND RED PAINT CO	2750 N LINCOLN	CHICAGO	IL	60614	COOK
* ILD005058037	GRIFFIN PLATING CO	2020 N HOLLY ST	CHICAGO	IL	60614	COOK
* ILD982074759	PEOPLES GAS LIGHT & COKE WILLOW ST STA	1701-1763 KINGSBURY	CHICAGO	IL	60614	COOK
* ILD981795545	PRAIRIE DEVELOPMENT LTD	2200 N LAKEWOOD	CHICAGO	IL	60614	COOK
* ILD049288764	WASHBURN T F DIV	2258 ELSTON	CHICAGO	IL	60614	COOK

RCRA and TSDS Sites

January, 1989

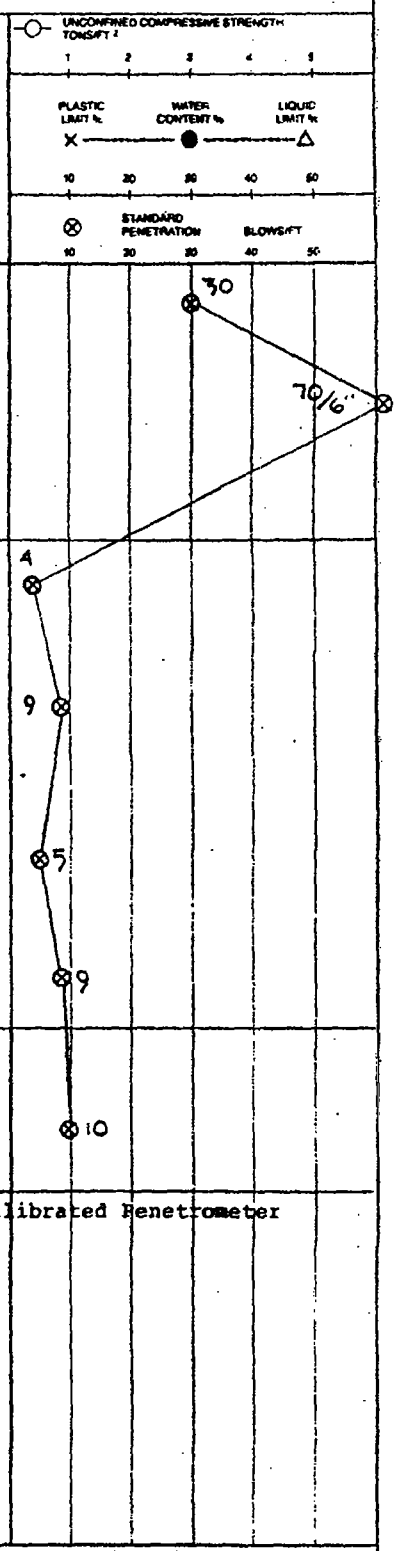
*	ILD005161898	SPANJER BROS INC	1160 N HOWE ST	CHICAGO	IL 60610
*	ILD049288814	SPRINT PRINT	116 W ILLINOIS	CHICAGO	IL 60610
*	ILD005065818	SUPERIOR PREMIER GRAPHICS	225 W SUPERIOR	CHICAGO	IL 60610
*	ILD025329756	TOWER OLDSMOBILE	1233 N WELLS	CHICAGO	IL 60610
*	ILD005104690	UNION SPECIAL CORP	400 N FRANKLIN ST	CHICAGO	IL 60610
*	ILD005105713	UNITY MFG CO	1260 N CLYBOURN AVE	CHICAGO	IL 60610
*	ILD980991095	ZIEBART	211 W WALTON ST	CHICAGO	IL 60610
*	ILD083084848	ALPINE CLEANERS	913 N STATE	CHICAGO	IL 60611
*	ILD074425216	AMERICAN DENTAL ASSOC	211 E CHICAGO STE 412	CHICAGO	IL 60611
*	ILD049811953	BREGY CLEANERS	542 N ST CLAIR	CHICAGO	IL 60611
*	ILD981957459	BRITISH CONSULATE GENERAL	202 N STREETER DR	CHICAGO	IL 60611
*	ILD980791693	CHICAGO CITY OF STATE STR EET DRAWBRIDGE	300 N STATE ST	CHICAGO	IL 60611
*	ILD980620124	CHICAGO SUN-TIMES	401 N WABASH	CHICAGO	IL 60611
*	ILD001754937	COLUMBIA LABEL CORP	431 E ILLINOIS ST	CHICAGO	IL 60611
*	ILD112551627	DAWSON HANLEY CADILLAC CO RP	630 N RUSH ST	CHICAGO	IL 60611
*	ILD069478840	EDIT CHICAGO VIDEO INC	160 E GRAND AVE	CHICAGO	IL 60611
*	ILD062484936	EDITEL CHICAGO	301 E ERIE ST	CHICAGO	IL 60611
*	ILD045687308	KIEFFER-NOLDE INC	160 E ILLINOIS ST	CHICAGO	IL 60611
*	ILD984766741	LAKESHORE ONTARIO ASSOCIA TES	401 E ONTARIO	CHICAGO	IL 60611
*	ILD005450754	MIDWEST LAW PRINTING CO	444 N WABASH	CHICAGO	IL 60611
*	ILD059457150	NORTHWESTERN MEMORIAL HOS PITAL	250 E SUPERIOR	CHICAGO	IL 60611
*	ILT180011546	NORTHWESTERN UNIVERSITY	303 E CHICAGO AVE	CHICAGO	IL 60611
*	ILD980903108	OPTIFEX INC	444 N WABASH AVE	CHICAGO	IL 60611
*	ILD062478516	OPTIMUS INC	161 E GRAND AVE	CHICAGO	IL 60611
*	ILD096799846	REVERE SUGAR CORP	330 E NORTH WATER ST	CHICAGO	IL 60611
*	ILD980502314	SANDOZ CROP PROTECTION	341 EAST OHIO STREET	CHICAGO	IL 60611
*	ILD113895510	247 E CHESTNUT CONDOMINIU M	247 E CHESTNUT	CHICAGO	IL 60611
*	ILD000810333	ACTION BUMPER	3010 W OHIO ST	CHICAGO	IL 60612
*	ILD005066741	ADAMS MFG CO	2034 W FULTON ST	CHICAGO	IL 60612
*	ILD005140512	AETNA PLATING WORKS INC	245 N WOLCOTT AVE	CHICAGO	IL 60612
*	ILD072351349	ALUMETCO LTD	2537 W TAYLOR ST	CHICAGO	IL 60612
*	ILD070693445	APCO METAL FINISHING INC	1657 W CARROLL AVE	CHICAGO	IL 60612
*	ILD005196605	ASSOCIATED FINISHERS INC	337 N BELL ST	CHICAGO	IL 60612
*	ILD005137948	BERQUIST PLATING CO	1657-63 W CARROLL	CHICAGO	IL 60612
*	ILD005140033	BERTHOLD GUS ELECTRIC CO	1900 W CARROLL AVE	CHICAGO	IL 60612
*	ILD005522982	BOBCO ENTERPRISES INC	737 N ALBANY AVE	CHICAGO	IL 60612
*	ILD005201280	BOND CHEMICAL CO	2100 W FULTON	CHICAGO	IL 60612
*	ILD005069158	CAPITOL HARDWARE CO	400 N LEAVITT ST	CHICAGO	IL 60612
*	ILD025080003	CHICAGO TAG AND LABEL CO	3049 W HARRISON ST	CHICAGO	IL 60612
*	ILD005116959	CONTINENTAL CHEMISTS CORP	2252 W OGDEN AVE	CHICAGO	IL 60612
*	ILD103332367	COOK CO MEDICAL EXAMINERS OFFICE	2121 W HARRISON	CHICAGO	IL 60612
*	ILD021295738	COOK COUNTY HOSPITAL	1635 W HARRISON	CHICAGO	IL 60612
*	ILD113560932	DECORATIVE PRODUCTS	2101 W CARROL	CHICAGO	IL 60612
*	ILD005103843	EAGLE GRINDING WHEEL CORP	2519 W FULTON ST	CHICAGO	IL 60612
*	ILD990787186	FILLIP METAL CABINET CO	3010-16 W OHIO	CHICAGO	IL 60612
*	ILD005116595	FILLIP METAL CABINET CO I NC	701 N ALBANY AVE	CHICAGO	IL 60612
*	ILD113727325	FOUR STAR CLEANERS	3115 W ROOSEVELT RD	CHICAGO	IL 60612
*	ILD005104393	GAW OHARA ENVELOPE CO	500 N SACRAMENTO BLVD	CHICAGO	IL 60612
*	ILD081031379	GENERAL SURFACE HARDENING INC	2108 W FULTON	CHICAGO	IL 60612
*	ILD079762506	GRAND AUTO BODY INC	2666 W GRAND AVE	CHICAGO	IL 60612
*	ILD093173490	ILLINOIS DEPT OF MENTAL H EALTH	1601 W TAYLOR ST	CHICAGO	IL 60612
*	ILD005202049	JANEEN ART STUDIO INC	2114 W GRAND AVE	CHICAGO	IL 60612

STS Consultants Ltd.

OWNER: Chicago Dock & Canal Trust	LOG OF BORING NUMBER: B-1 (MW-1)
PROJECT NAME: Chicago Park District Dedications	ARCHITECT-ENGINEER:

SITE LOCATION: East North Water Street and Lake Shore Drive, Chicago, IL

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS/FT.³
SURFACE ELEVATION						
	1	SS			Fill, clay, gravel, sand, bricks, wood, crushed limestone, concrete - black - gray - dense - moist - (Fill)	
2.5		PA			Composite sample retained for analytical	
	2	SS			testing	
		PA				
5						
	3	SS			Silty clay and sand, fill, trace gravel and bricks - gray - loose - moist - saturated (Fill)	
7.5		PA			Thin fine sand lenses	
	4	SS				
10		PA				
	5	SS				
12.5		PA				
	6	SS				
15		PA			Clayey sand, trace silt and gravel - gray - medium dense - saturated - (Fill-SC)	
	7	SS				
17					End of boring Borehole grouted upon completion Installed well at 13' as per attached monitoring well installation diagram	



*Calibrated Penetrometer

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

WL: 9'	WS OR WCR	BORING STARTED: 2/17/89	STS OFFICE: Northbrook - 01
WL	BCR / ACR	BORING COMPLETED: 2/17/89	DRAWN BY: KKB; SHEET NO: 1 OF 1
WL		RIG FOREMAN: DR-16/M. Baker	APP'D BY: DLG/lk; STS JOB NO.: 25400-XH

BL.3-0687

STS Consultants Ltd

OWNER: Chicago Dock & Canal Trust	LOG OF BORING NUMBER: B-5
PROJECT NAME: Chicago Park District Dedications	ARCHITECT-ENGINEER

SITE LOCATION: East North Water Street and Lake Shore Drive, Chicago, IL

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
						SURFACE ELEVATION	
		1	SS			Fill, trace to little clay, gravel, coal, cinders, brick fragments, crushed limestone and organic material - medium dense - moist (Fill)	
2.5			PA				
		2	SS			Sandy clay, little silt, trace gravel, thin fine sand lenses - brownish gray - loose - moist (Fill)	
						Sample S-3 retained for analytical testing	
5			PA				
		3	SS				
7.5			PA				
		4	SS				
10			PA				
		5	SS				
12.5			PA				
		6	SS				
15			PA				
		7	SS				
17						End of boring Borehole grouted upon completion	

UNCONFINED COMPRESSIVE STRENGTH - TONS/FT.² (1, 2, 3, 4, 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT (10, 20, 30, 40, 50)

Standard penetration values: 17, 19, 6, 15, 7, 6, 6

*Calibrated Penetrometer

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL

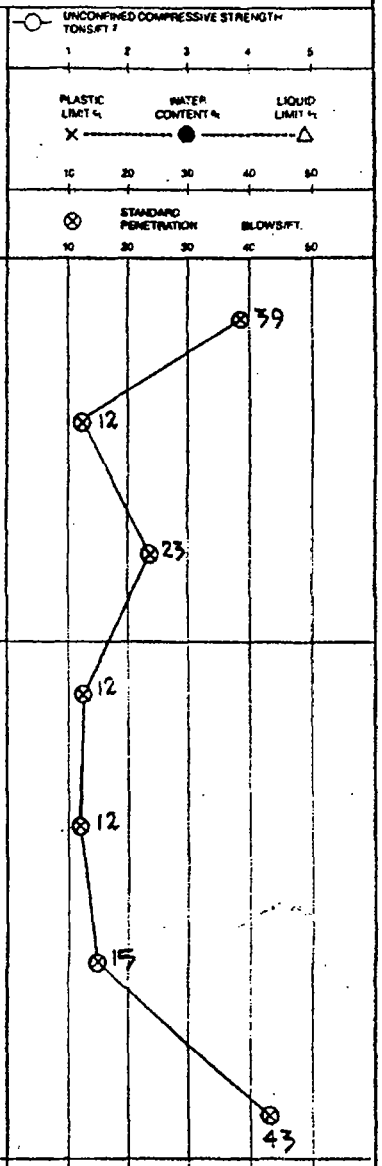
WL 8' WS OR WD	BORING STARTED 2/16/89	STS OFFICE Northbrook - 01	
WL BCR ACR	BORING COMPLETED 2/16/89	DRAWN BY KKB	SHEET NO 1 OF 1
WL 9' AB	RIG FOREMAN DR-16/M. Baker	APP'D BY DLG/lk	STS JOB NO. 25400-XH

BL:3-0667

STS ConsultAnts Ltd.

OWNER: Chicago Dock & Canal Trust	LOG OF BORING NUMBER: B-8
PROJECT NAME: Chicago Park District Dedications	ARCHITECT-ENGINEER:
SITE LOCATION: East North Water Street and Lake Shore Drive, Chicago, IL	

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
						SURFACE ELEVATION	
			PA			Fill, trace to little gravel, sand, asphalt grindings, cinders, coal, crushed limestone, concrete and wood - brown and black - medium dense - moist - (Fill)	
2.5		1	SS			HNU on S-3: 70ppm, solvent odor in S-3;	
		2	SS			Composite sample retained for analytical testing	
5			PA				
		3	SS				
7.5			PA			Sand, trace silt, clay, and gravel - brown - medium dense to dense - moist - saturated (Fill-SW)	
		4	SS			HNU on S-4: 1ppm; S-5, S-6: 1ppm	
10			PA				
		5	SS				
12.5			PA				
		6	SS				
15			PA				
		7	SS				
16.5						End of boring Borehole grouted upon completion Installed well at 12'6" as per attached monitoring well installation diagram	



*Calibrated Penetrometer

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL

WL 8'6" WS OR WCK	BORING STARTED 2/16/89	STS OFFICE Northbrook - 01	
WL BCR ACR	BORING COMPLETED 2/16/89	DRAWN BY KKB	SHEET NO 1 OF 1
WL	RIG FOREMAN DR-16/M. Baker	APP'D BY DLG/lk	STS JOB NO 25400-XH

BL:3-0667

STS Consultants Ltd.

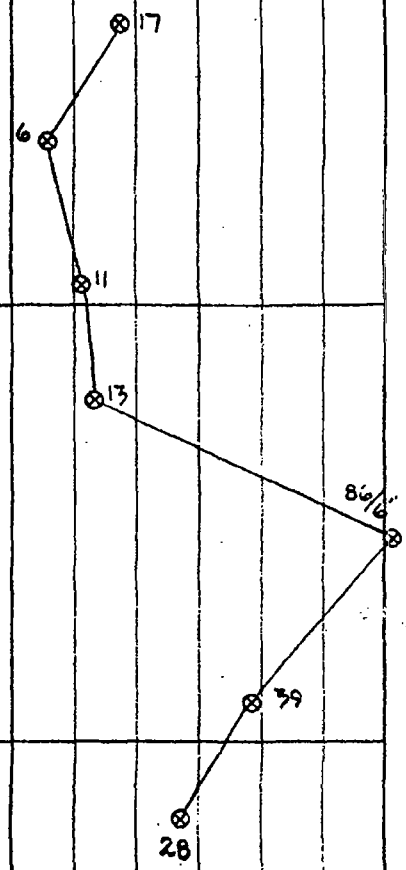
OWNER: Chicago Dock & Canal Trust	LOG OF BORING NUMBER: B-10
PROJECT NAME: Chicago Park District Dedications	ARCHITECT-ENGINEER:
SITE LOCATION: East North Water Street and Lake Shore Drive, Chicago, IL	

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE / RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
SURFACE ELEVATION					
	1	SS		Fill, trace to little gravel, sand, asphalt grindings, cinders, brick fragments, crushed limestone - brown and black - reddish - loose medium dense - moist (Fill)	
2.5		PA			
	2	SS			
5		PA			
	3	SS			
				Fill, little sand, bricks, crushed limestone, trace gravel, cinders, wood and concrete - brown and black - reddish - medium dense - (Fill)	
7.5		PA			
	4	SS		Sample S-6 retained for analytical testing	
10		PA			
	5	SS			
		PA			
12.5					
	6	SS			
				Sand, trace silt and gravel - brown - dense - saturated (Fill-SW)	
15		PA			
	7	SS			
17				End of boring Borehole grouted upon completion	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² (1 2 3 4 5)

PLASTIC LIMIT % × — WATER CONTENT % ● — LIQUID LIMIT % △ (10 20 30 40 50)

STANDARD PENETRATION BLOWS/FT. ⊗ (10 20 30 40 50)



*Calibrated Penetrometer

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

WL 7'6" WS OR WD	BORING STARTED 2/16/89	STS OFFICE Northbrook - 01	
WL BCR ACR	BORING COMPLETED 2/16/89	DRAWN BY KKB	SHEET NO 1 OF 1
WL	RIG FOREMAN DR-16/M. Baker	APP'D BY DLG/lk	STS JOB NO. 25400-XH

BL:3-0687

STS Consultants Ltd.

OWNER: Chicago Dock & Canal Trust	LOG OF BORING NUMBER: R-2
PROJECT NAME: Chicago Park District Dedications	ARCHITECT-ENGINEER
SITE LOCATION: E. North Water Street & Lake Shore Drive	

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO	SAMPLE TYPE	SAMPLE DISTANCE RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
					SURFACE ELEVATION	
					Sheeting	
2.5						
5.0						
					Water	
7.5						
22.5			RB		Sand and Gravel, trace silt, clay and rock fragments - black and gray - saturated (Fill)	
25.0		1	SS			
			RB			
27.5		2	SS			
			RB		Silty clay, trace gravel and sand - gray - saturated (CL)	
30.0		3	SS			
32.0					END OF BORING	
					Chicago River Boring	
					Note: Composite sample retained for analysis	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² : 1 2 3 4 5

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %

10 20 30 40 50

STANDARD PENETRATION BLOWS/FT. 10 20 30 40 50

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL.

WL WS OR WD	BORING STARTED 3/10/89	STS OFFICE Northbrook-01	
WL BCR ACR	BORING COMPLETED 3/10/89	DRAWN BY KKB	SHEET NO. 1 OF 1
WL	RIG FOREMAN DR-16/M. Baker	APP'D BY DLG/ngt	STS JOB NO. 25400-XH

STS Consultants Ltd.

OWNER	LOG OF BORING NUMBER
Chicago Dock & Canal Trust	R-1
PROJECT NAME	**ARCHITECT-ENGINEER**
Chicago Park District Dedication	

SITE LOCATION
E. North Water Street & Lake Shore Drive

UNCONFINED COMPRESSIVE STRENGTH TONS/FT² (1, 2, 3, 4, 5)
PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT %
STANDARD PENETRATION BLOWS/FT. (10, 20, 30, 40, 50)

DEPTH (FT) / ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
					SURFACE ELEVATION	
					Sheeting	
2.5						
5.0						
					Water	
7.5						
22.5						
					Rubble fill, trace coal, cinders, bricks - Saturated	
25.0		RB				
	1	SS				
	1A	SS			Silty sand, trace clay and gravel - gray - saturated (SM-SC)	
27.5					Silty clay, trace gravel and sand - gray - saturated (CL)	
		RB				
	2	SS				
30.0						
		RB				
	3	SS				
32.5						
33.0					END OF BORING	
					Chicago River Boring	
					Note: Composite sample retained for analysis	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

WL	WS OR WD	BORING STARTED	STS OFFICE	
		3/10/89	Northbrook-01	
WL	BCR ACR	BORING COMPLETED	DRAWN BY	SHEET NO. OF
		3/10/89	KKB	1 1
WL		RIG FOREMAN	APP'D BY	STS JOB NO.
		DR-16/M. Baker	DLG/ngt	25400-XH

BL:3-0687

STS Consultants Ltd.

OWNER: Chicago Dock & Canal Trust	LOG OF BORING NUMBER: 12
PROJECT NAME: Environmental Reconnaissance	ARCHITECT-ENGINEER:

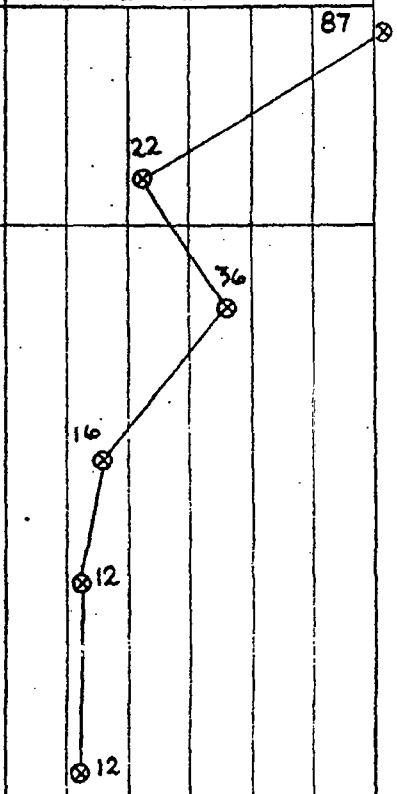
SITE LOCATION: McClurg Ct. and Illinois Street

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
						SURFACE ELEVATION	
		1	SS			Trace cinders, bricks, coal, sand and gravel fill - brown and black - medium dense and extra dense - moist (Fill)	
2.5			PA				
		2	SS				
5			PA			Fine sand, trace silt and gravel - brown - medium dense and dense - moist and saturated (SP) Note: Thin gravel lenses	
		3	SS				
7.5			PA				
		4	SS				
10			PA				
		5	SS				
12.5			PA				
		6	SS				
15						END OF BORING Borehole grouted upon completion	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² (1 2 3 4 5)

PLASTIC LIMIT % — WATER CONTENT % — LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)



*Calibrated Penetrometer

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL

WL 11'6" WS — WS OR WD	BORING STARTED 6/2/88	STS OFFICE Northbrook	
WL — BCR — ACR	BORING COMPLETED 6/2/88	DRAWN BY KKB	SHEET NO. 1 OF 1
WL 11'6" AR	RIG FOREMAN DR-77/DG	APP'D BY DLG/pt	STS JOB NO 25400-XF

ISL-3-0687

STS Consultants Ltd.

OWNER: Chicago Dock & Canal Trust	LOG OF BORING NUMBER: 19
PROJECT NAME: Environmental Reconnaissance	ARCHITECT-ENGINEER
SITE LOCATION: McClurg Ct. and Illinois Street	

DEPTH (FT)	ELEVATION (FT)	SAMPLE NO.	SAMPLE TYPE	SAMPLE DISTANCE	RECOVERY	DESCRIPTION OF MATERIAL	UNIT DRY WT. LBS./FT.³
						SURFACE ELEVATION	
		1	SS			Cinders, brick, coal, wood fill - brown and black - medium dense and extra dense - moist (Fill)	
2.5			PA				
		2	SS				
5			PA				
		3	SS				
7.5			PA			Fine to medium sand, trace silt, gravel and roots - brown and gray - medium dense - moist and saturated (SP) Note: Thin gravel lenses	
		4	SS			Driller's Note: Odor at 9'	
10			PA				
		5	SS				
12.5			PA				
		6	SS				
15						END OF BORING Borehole grouted upon completion	

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.² (1 2 3 4 5)

PLASTIC LIMIT % | WATER CONTENT % | LIQUID LIMIT %

STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)

30 81 16 27 20 21

*Calibrated Penetrometer

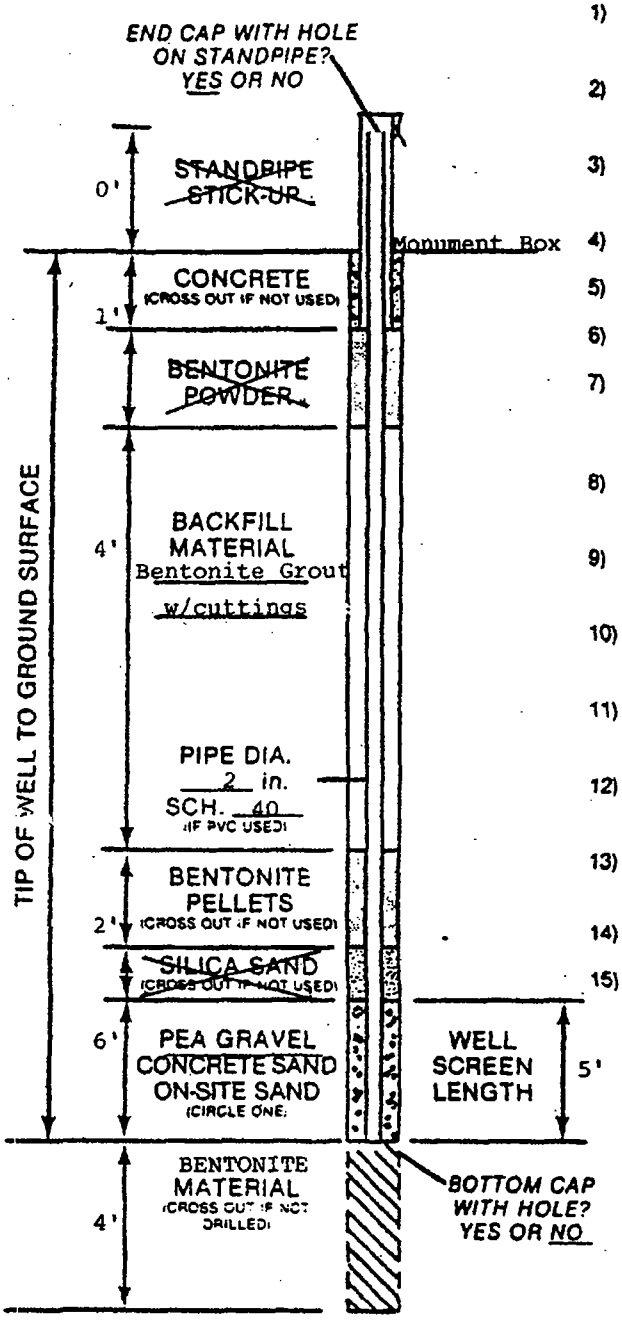
THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES: IN-SITU. THE TRANSITION MAY BE GRADUAL

WL 10" WS OR WD	BORING STARTED 6/2/88	STS OFFICE Northbrook	
WL BCR ACR	BORING COMPLETED 6/2/88	DRAWN BY KKB	SHEET NO 1 OF 1
WL 10'6" AB	RIG FOREMAN	APP'D BY DLG/nt	STS JOB NO. 25400-XF

BL:3-0687

STS Consultants Ltd.

FIELD WELL INSTALLATION DIAGRAM



1) TYPE OF PIPE?
PVC, GALVANIZED, STAINLESS, OTHER _____

2) TYPE OF PIPE JOINTS?
BELLED, COUPLINGS, THREADED, OTHER _____

3) TYPE OF WELL SCREEN
PVC, GALVANIZED, STAINLESS, OTHER _____

4) SCREEN SIZE 0.010 slot

5) INSTALLED PROTECTOR PIPE W/LOCK? YES OR NO

6) WAS SOLVENT USED? YES OR NO

7) WAS DRILLING MUD USED?
SOLID AUGER, HOLLOW STEM AUGER, WATER, REVERT, BENTONITE

8) DID STANDPIPE COME UP WHEN CASING WAS PULLED?
YES OR NO

9) HOW WAS WELL DEVELOPED?
BAILING, PUMPING, SURGING, COMPRESSED AIR

10) TIME SPENT FOR WELL DEVELOPMENT?
5 min., 15 min., 30 min., OTHER _____

11) APPROXIMATE WATER VOLUME REMOVED OR ADDED?
5 gal., 10 gal., 15 gal., OTHER _____

12) WATER CLARITY BEFORE DEVELOPMENT?
CLEAR, TURBID, OPAQUE

13) WATER CLARITY AFTER DEVELOPMENT?
CLEAR, TURBID, OPAQUE

14) DID THE WATER SMELL? YES OR NO

15) WATER LEVEL SUMMARY

1) DEPTH FROM T. STANDPIPE AFTER DEVELOPMENT?
_____ Ft. or DRY

2) OTHER MEASUREMENTS:

DATE 2/20/89 9'4" Ft. FROM T. ST. PIPE

DATE _____ Ft. FROM T. ST. PIPE

DATE _____ Ft. FROM T. ST. PIPE

DATE _____ Ft. FROM T. ST. PIPE

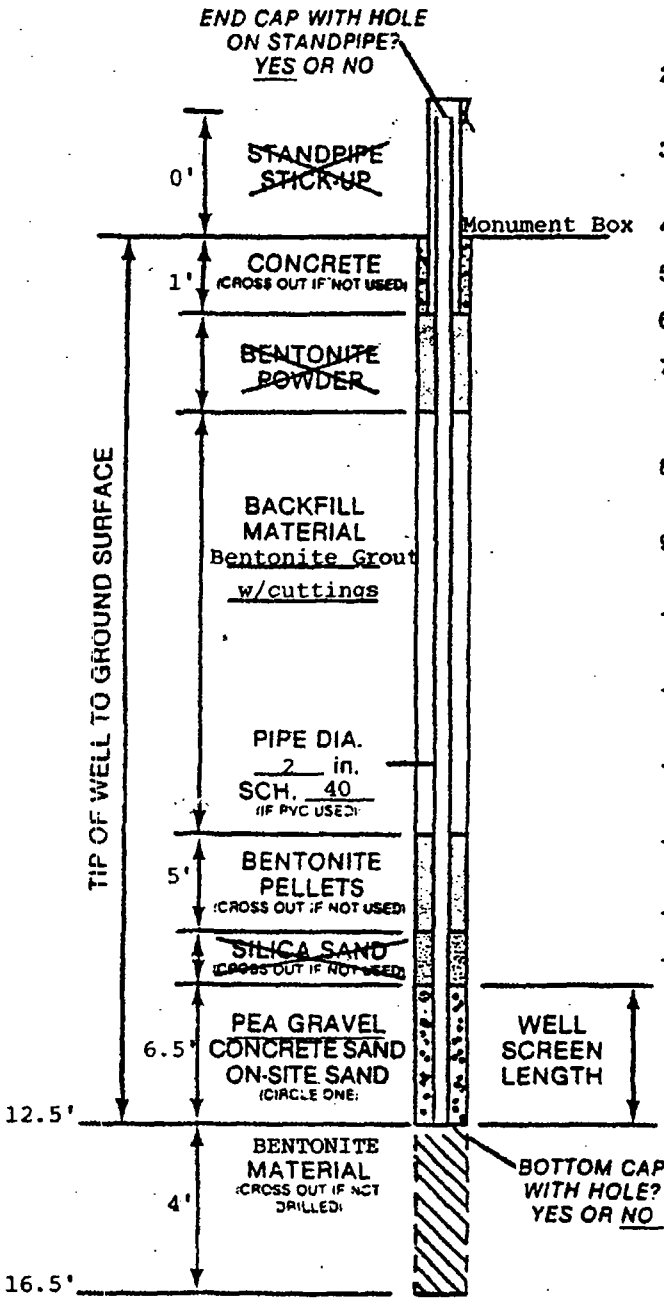
Well No. MW-1(B-1) DATE INSTALLED 2/17/89 DRILL RIG DR-16

DRILLER M. Baker DRILL CREW S. Newlin, J. Edgar

JOB/CLIENT Chicago Dock & Canal Trust STS JOB No. 25400-XH

STS Consultants Ltd.

FIELD WELL INSTALLATION DIAGRAM



1) TYPE OF PIPE?
PVC, GALVANIZED, STAINLESS, OTHER _____

2) TYPE OF PIPE JOINTS?
BELLED, COUPLINGS, THREADED, OTHER _____

3) TYPE OF WELL SCREEN
PVC, GALVANIZED, STAINLESS, OTHER _____

4) SCREEN SIZE 0.010 Slot

5) INSTALLED PROTECTOR PIPE W/LOCK? YES OR NO

6) WAS SOLVENT USED? YES OR NO

7) WAS DRILLING MUD USED? NO
SOLID AUGER, HOLLOW STEM AUGER, WATER, REVERT, BENTONITE

8) DID STANDPIPE COME UP WHEN CASING WAS PULLED?
YES OR NO

9) HOW WAS WELL DEVELOPED?
BAILING, PUMPING, SURGING, COMPRESSED AIR

10) TIME SPENT FOR WELL DEVELOPMENT?
5 min., 15 min., 30 min., OTHER _____

11) APPROXIMATE WATER VOLUME REMOVED OR ADDED?
5 gal., 10 gal., 15 gal., OTHER _____

12) WATER CLARITY BEFORE DEVELOPMENT?
CLEAR, TURBID, OPAQUE

13) WATER CLARITY AFTER DEVELOPMENT?
CLEAR, TURBID, OPAQUE

14) DID THE WATER SMELL? YES OR NO

15) WATER LEVEL SUMMARY

1) DEPTH FROM T. STANDPIPE AFTER DEVELOPMENT?
9.5' Ft. or DRY

2) OTHER MEASUREMENTS:

DATE 2/20/89 . 8.6 Ft. FROM T. ST. PIPE

DATE _____ . _____ Ft. FROM T. ST. PIPE

DATE _____ . _____ Ft. FROM T. ST. PIPE

DATE _____ . _____ Ft. FROM T. ST. PIPE

Well No. MW-8(B-8) DATE INSTALLED 2/16/89 DRILL RIG DR-16

DRILLER M. Baker DRILL CREW S. Newlin, J. Edgar

JOB/CLIENT Chicago Dock & Canal Trust STS JOB No. 25400-XH

STS General Notes

STS CONSULTANTS, LTD.

DRILLING & SAMPLING SYMBOLS:

SS : Split Spoon-1 3/8" I.D., 2" O.D. Unless otherwise noted
ST : Shelby Tube-2" O.D., Unless otherwise noted
PA : Power Auger
DB : Diamond Bit-NX, BX, AX
AS : Auger Sample
JS : Jar Sample
VS : Vane Shear
OS : Osterberg Sampler-3" Shelby Tube
HS : Hollow Stem Auger
WS : Wash Sample
FT : Fish Tail
RB : Rock Bit
BS : Bulk Sample
PM : Pressuremeter Test, In-Situ
GS : Giddings Sampler

Standard "N" Penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2 inch O.D. split spoon sampler, except where otherwise noted.

WATER LEVEL MEASUREMENT SYMBOLS:

WL : Water Level
WS : While Sampling
WD : While Drilling
AB : After Boring
WCI : Wet Cave In
DCI : Dry Cave In
BCR : Before Casing Removal
ACR : After Casing Removal

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable groundwater levels. In impervious soils, the accurate determination of groundwater elevations may not be possible, even after several days of observations; additional evidence of groundwater elevations must be sought.

GRADATION DESCRIPTION & TERMINOLOGY:

Coarse Grained or Granular Soils have more than 50% of their dry weight retained on a #200 sieve; they are described as: boulders, cobbles, gravel or sand. Fine Grained soils have less than 50% of their dry weight retained on a #200 sieve; they are described as: clays or clayey silts if they are cohesive and silts if they are non-cohesive. In addition to gradation, granular soils are defined on the basis of their relative in-place density and fine grained soils on the basis of their strength or consistency and their plasticity.

Major Component Of Sample	Size Range	Description Of Components Also Present in Sample	Percent Of Dry Weight
Boulders	Over 8 in. (200 mm)	Trace	1-9
Cobbles	8 inches to 3 inches (200 mm to 75 mm)	Little	10-19
Gravel	3 inches to #4 sieve (75 mm to 4.76 mm)	Some	20-34
Sand	#4 to #200 sieve (4.76 mm to 0.074 mm)	And	35-50
Silt	Passing #200 sieve (0.074 mm to 0.005 mm)		
Clay	Smaller than 0.005 mm		

CONSISTENCY OF COHESIVE SOILS:

Unconfined Compressive Strength, Qu, tsf	Consistency
0.25	Very Soft
0.25-0.49	Soft
0.50-0.99	Medium (Firm)
1.00-1.99	Stiff
2.00-3.99	Very Stiff
4.00-8.00	Hard
>8.00	Very Hard

RELATIVE DENSITY OF GRANULAR SOILS:

N-Blows per ft.	Relative Density
0-3	Very Loose
4-9	Loose
10-29	Medium Dense
30-49	Dense
50-80	Very Dense
>80	Extremely Dense

STS Soil Classification System

UNIFIED SOIL CLASSIFICATION

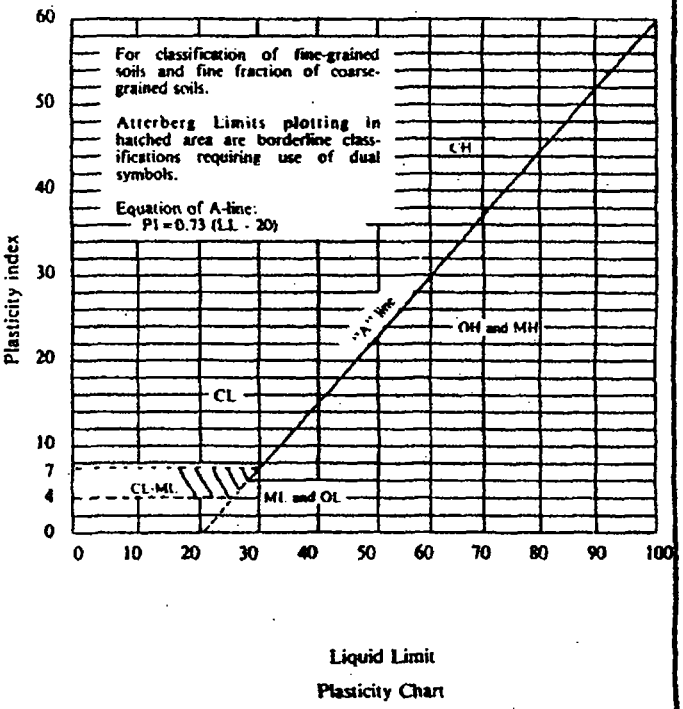
Major Divisions			Group symbols	Typical names	Laboratory classification criteria
Coarse-grained soils (More than half of material is *larger* than No. 200 sieve size)	Gravels (More than half of coarse fraction larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-grades gravels, gravel-sand mixtures, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW
		Gravels with fines (Appreciable amount of fines)	GM d / u	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4
			GC	Clayey gravels, gravel-sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7
	Sands (More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3
			SP	Poorly graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW
		Sands with fines (Appreciable amount of fines)	SM d / u	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4
			SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line with P.I. greater than 7
Fine-grained soils (More than half of material is *smaller* than No. 200 sieve)	Silts and clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
			OL	Organic silts and organic silty clays of low plasticity	
	Silts and clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	
			CH	Inorganic clays of high plasticity, fat clays	
			OH	Organic clays of medium to high plasticity, organic silts	
	Highly organic soils		Pt	Peat and other highly organic soils	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

- Less than 5 per cent ..... GW, GP, SW, SP
- More than 12 per cent ..... GM, GC, SM, SC
- 5 to 12 per cent ..... *Borderline* cases requiring dual symbols

Above "A" line with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols

Limits plotting in hatched zone with P.I. between 4 and 7 are *borderline* cases requiring use of dual symbols



Plasticity Chart

SUBSURFACE EXPLORATION PROCEDURES

Hand-Auger Drilling (HA)

In this procedure, a sampling device is driven into the soil by repeated blows of a sledge hammer. When the sampler is driven to the desired sample depth, the soil sample is retrieved. The hole is then advanced by manually turning the hand auger until the next sampling depth increment is reached. The hand auger drilling between sampling intervals also helps to clean and enlarge the bore hole in preparation for obtaining the next sample.

Power Auger Drilling (PA)

In this type of drilling procedure, continuous flight augers are used to advance the bore holes. They are turned and hydraulically advanced by a truck or track-mounted unit as site accessibility dictates. In auger drilling, casing and drilling mud are not required to maintain open bore holes.

Hollow Stem Auger Drilling (HS)

In this drilling procedure, continuous flight augers having open stems are used to advance the bore holes. The open stem allows the sampling tool to be used without removing the augers from the bore hole. Hollow stem augers thus provide support to the sides of the bore hole during the sampling operations.

Rotary Drilling (RB)

In employing rotary drilling methods, various cutting bits are used to advance the bore holes. In this process, surface casing and/or drilling fluids are used to maintain open bore holes.

Diamond Core Drilling (DB)

Diamond core drilling is used to sample cemented formations. In this procedure, a double tube (triple tube) core barrel with a diamond bit cuts an annular space around a cylindrical prism of the material sampled. The sample is retrieved by a catcher just above the bit. Samples recovered by this procedure are placed in sturdy containers in sequential order.

SAMPLING PROCEDURES

Auger Sampling (AS)

In this procedure, soil samples are collected from cuttings off of the auger flights as they are removed from the ground. Such samples provide a general indication of subsurface conditions; however, they do not provide undisturbed samples, nor do they provide samples from discrete depths.

Split-Barrel Sampling (SS) — (ASTM Standard D-1586-84)

In the split-barrel sampling procedure, a 2 inch O.D., split barrel sampler is driven into the soil a distance of 18 inches by means of a 140 pound hammer falling 30 inches. The value of the Standard Penetration Resistance is obtained by counting the number of blows of the hammer over the final 12 inches of driving. This value provides a qualitative indication of the in-place relative density of cohesionless soils. The indication is qualitative only, however, since many factors can significantly affect the Standard Penetration Resistance Value, and direct correlation of results obtained by drill crews using different rigs, drilling procedures, and hammer-rod-spoon assemblies should not be made. A portion of the recovered sample is placed in a sample jar and returned to the laboratory for further analysis and testing.

Shelby Tube Sampling Procedure (ST) — (ASTM Standard D-1587-83)

In the shelby tube sampling procedure, a thin-walled steel seamless tube with a sharp cutting edge is pushed hydraulically into the soil and a relatively undisturbed sample is obtained. This procedure is generally employed in cohesive soils. The tubes are carefully handled in the field to avoid excessive disturbance and are returned to the laboratory for extrusion and further analysis and testing.

Giddings Sampler (GS)

This type of sampling device consists of 5-ft. sections of thin-wall tubing which are capable of retrieving continuous columns of soil in 5-ft. maximum increments. Because of a continuous slot in the sampling tubes, the sampler allows field determination of stratification boundaries and containerization of soil samples from any sampling depth within the 5-ft. interval.

LABORATORY PROCEDURES

Water Content (Wc)

The water content of a soil is the ratio of the weight of water in a given soil mass to the weight of the dry soil. Water content is generally expressed as a percentage.

Hand Penetrometer (Qp)

In the hand penetrometer test, the unconfined compressive strength of a soil is determined, to a maximum value of 4.5 tons per square foot (tsf), by measuring the resistance of the soil sample to penetration by a small, spring-calibrated cylinder. The hand penetrometer test has been carefully correlated with unconfined compressive strength tests, and thereby provides a useful and a relatively simple testing procedure in which soil strength can be quickly and easily estimated.

Unconfined Compression Tests (Qu)

In the unconfined compression strength test, an undisturbed prism of soil is loaded axially until failure or until 20% strain has been reached, whichever occurs first.

Dry Density (γ_D)

The dry density is the quantity used as a measure of the amount of solids in a unit volume of soil aggregate. Use of this value is often made when measuring the degree of compaction of a soil.

Classification of Samples

In conjunction with the sample testing program, all soil samples are examined in our laboratory and classified on the basis of their texture and plasticity in accordance with United Soil Classification System (USCS). The soil descriptions on the boring logs are in conformance with this system and the estimated group symbols according to this system are included in parentheses following the soil descriptions on the boring logs. Included on a separate sheet entitled "General Notes" is a brief explanation of this system of soil classification.

STS Standard Boring Log Procedures

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In the process of obtaining and testing samples and preparing this report, standard procedures are followed regarding field logs, laboratory data sheets and samples.

*Field logs are prepared during performance of the drilling and sampling operations and are in*tended to essentially portray field occurrences, sampling locations and procedures.

Samples obtained in the field are frequently subjected to additional testing and reclassification in the laboratory by more experienced soil engineers, and differences between the field logs and the final logs may exist.

The engineer preparing the report reviews the field and laboratory logs, classifications and test data, and using judgment and experience in interpreting this data, may make further changes.

Samples taken in the field, some of which are later subjected to laboratory tests, are retained in our laboratory for sixty days and are then destroyed unless special disposition is requested by our client. Samples retained over a long period of time, even in sealed jars, are subject to moisture loss which changes the apparent strength of cohesive soil, generally increasing the strength from what was originally encountered in the field. Since they are then no longer representative of the moisture conditions initially encountered, observers of these samples should recognize this factor.

It is common practice in the geotechnical engineering profession that field logs and laboratory data sheets not included in engineering reports, because they do not represent the engineer's final opinions as to appropriate descriptions for conditions encountered in the exploration and testing work. On the other hand, we are aware that perhaps certain contractors and subcontractors submitting bids or proposals on work might have an interest in studying these documents before submitting a bid or proposal. For this reason, the field logs are retained in our office for review by all contractors submitting a bid or proposal. We would welcome the opportunity to explain any changes that have been and typically are made in the preparation of our final reports, to the contractor or subcontractors, before the firm submits its bid or proposal, and to describe how the information was obtained to the extent the contractor or subcontractor wishes. Results of laboratory tests are generally shown on the boring logs or are described in the text of the report, as appropriate.

The descriptive terms and symbols used on the logs are described on the attached sheet, entitled: "General Notes".

AMERICAN SOCIETY FOR TESTING AND MATERIALS

Standard Method for PENETRATION TEST AND SPLIT-BARREL SAMPLING OF SOILS[1]

This standard is issued under the fixed designation D 1586; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of the last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This method has been approved for use by agencies of the Department of Defense and for listing in the DOD Index of Specifications and Standards.

1. Scope

1.1 This method describes the procedure, generally known as the Standard Penetration Test (SPT), for driving a split-barrel sampler to obtain a representative soil sample and a measure of the resistance of the soil to penetration of the sampler.

1.2 This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. For a specific precautionary statement, see 6.4.1.

1.3 The values stated in inch-pound units are to be regarded as the standard.

2. Applicable Documents

2.1 ASTM Standards:

D2487 Test Method for Classification of Soils for Engineering Purposes[2]

D2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)[2]

D4220 Practice for Preserving and Transporting Soil Samples[2]

3. Descriptions of Terms Specific to This Standard

3.1 anvil—that portion of the drive-weight assembly which the hammer strikes and through which the hammer energy passes into the drill rods.

3.2 cathead—the rotating drum or windlass in the rope-cathead lift system around which the operator wraps a rope to lift and drop the hammer by successively tightening and loosening the rope turns around the drum.

3.3 drill rods—rods used to transmit downward force and torque to the drill bit while drilling a borehole.

3.4 drive-weight assembly—a device consisting of the hammer, hammer fall guide, the anvil, and any hammer drop system.

3.5 hammer—that portion of the drive-weight assembly consisting of the 140 ± 2 lb (63.5 ± 1 kg) impact weight which is successively lifted and dropped to provide the energy that accomplishes the sampling and penetration.

3.6 hammer drop system—that portion of the drive-weight assembly by which the operator accomplishes the lifting and dropping of the hammer to produce the blow.

3.7 hammer fall guide—that part of the drive-weight assembly used to guide the fall of the hammer.

3.8 N-value—the blowcount representation of the penetration resistance of the soil. The N-value, reported in blows per foot, equals the sum of the number of blows required to drive the sampler over the depth interval of 6 to 18 in. (150 to 450 mm) (see 7.3).

3.9 ΔN—the number of blows obtained from each of the 6-in. (150-mm) intervals of sampler penetration (see 7.3).

3.10 number of rope turns—the total contact angle between the rope and the cathead at the beginning of the operator's rope slackening to drop the hammer, divided by 360° (see Fig. 1).

3.11 sampling rods—rods that connect the drive-weight assembly to the sampler. Drill rods are often used for this purpose.

3.12 SPT—abbreviation for Standard Penetration Test, a term by which engineers commonly refer to this method.

4. Significance and Use

4.1 This method provides a soil sample for identification purposes and for laboratory tests appropriate for soil obtained from a sampler that may produce large shear strain disturbance in the sample.

4.2 This method is used extensively in a great variety of geotechnical exploration projects. Many local correlations and widely published correlations which relate SPT blowcount, or N-value, and the engineering behavior of earthworks and foundation are available.

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[1] This method is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of subcommittee D18.02 on Sampling and Related Field Testing for Soil Investigations.

Current edition approved Sept. 11, 1984. Published November 1984. Originally published as D1586—58T. Last previous edition D1586—67 (1974).

[2] Annual Book of ASTM Standards, Vol 04.08.

5. Apparatus

5.1 Drilling Equipment—Any drilling equipment that provides at the time of sampling a suitably clean open hole before insertion of the sampler and ensures that the penetration test is performed on undisturbed soil shall be acceptable. The following pieces of equipment have proven to be suitable for advancing a borehole in some subsurface conditions.

5.1.1 Drag, Chopping, and Fishtail Bits, less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm) in diameter may be used in conjunction with open-hole rotary drilling or casing-advancement drilling methods. To avoid disturbance of the underlying soil, bottom discharge bits are not permitted; only side discharging bits are permitted.

5.1.2 Roller-Cone Bits, less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm) in diameter may be used in conjunction with open-hole rotary drilling or casing-advancement drilling methods if the drilling fluid discharge is deflected.

5.1.3 Hollow-Stem Continuous Flight Augers, with or without a center bit assembly, may be used to drill the boring. The inside diameter of the hollow-stem augers shall be less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm).

5.1.4 Solid, Continuous Flight, Bucket and Hand Augers, less than 6.5 in. (162 mm) and greater than 2.2 in. (56 mm) in diameter may be used if the soil on the side of the boring does not cave onto the sampler or sampling rods during sampling.

5.2 Sampling Rods—Flush-joint steel drill rods shall be used to connect the split-barrel sampler to the drive-weight assembly. The sampling rod shall have a stiffness (moment of inertia) equal to or greater than that of parallel wall "A" rod (a steel rod which has an outside diameter of 1⅝ in. (41.2 mm) and an inside diameter of 1⅜ in. (28.5 mm).

NOTE 1—Recent research and comparative testing indicates the type rod used, with stiffness ranging from "A" size rod to "N" size rod, will usually have a negligible effect on the N-values to depths of at least 100 ft (30 m).

5.3 Split-Barrel Sampler—The sampler shall be constructed with the dimensions indicated in Fig. 2. The driving shoe shall be of hardened steel and shall be replaced or repaired when it becomes dented or distorted. The use of liners to produce a constant inside diameter of 1⅜ in. (35 mm) is permitted, but shall be noted on the penetration record if used. The use of a sample retainer basket is permitted, and should also be noted on the penetration record if used.

NOTE 2—Both theory and available test data suggest that N-values may increase between 10 to 30% when liners are used.

5.4 Drive-Weight Assembly:

5.4.1 Hammer and Anvil—The hammer shall weigh 140 ± 2 lb (63.5 ± 1 kg) and shall be a solid rigid metallic mass. The hammer shall strike the anvil and make steel on steel contact when it is dropped. A hammer fall guide permitting a free fall shall be used. Hammers used with the cathead and rope method shall have an unimpeded overlift capacity of at least 4 in. (100 mm). For safety reasons, the use of a hammer assembly with an internal anvil is encouraged.

NOTE 3—It is suggested that the hammer fall guide be permanently marked to enable the operator or inspector to judge the hammer drop height.

5.4.2 Hammer Drop System—Rope-cathead, trip, semi-automatic, or automatic hammer drop systems may be used, providing the lifting apparatus will not cause penetration of the sampler while re-engaging and lifting the hammer.

5.5 Accessory Equipment—Accessories such as labels, sample containers, data sheets, and groundwater level measuring devices shall be provided in accordance with the requirements of the project and other ASTM standards.

6. Drilling Procedure

6.1 The boring shall be advanced incrementally to permit intermittent or continuous sampling. Test intervals and locations are normally stipulated by the project engineer or geologist. Typically, the intervals selected are 5 ft (1.5 m) or less in homogeneous strata with test and sampling locations at every change of strata.

6.2 Any drilling procedure that provides a suitably clean and stable hole before insertion of the sampler and assures that the penetration test is performed on essentially undisturbed soil shall be acceptable. Each of the following procedures have proven to be acceptable for some subsurface conditions. The subsurface conditions anticipated should be considered when selecting the drilling method to be used.

6.2.1 Open-hole rotary drilling method.

6.2.2 Continuous flight hollow-stem auger method.

6.2.3 Wash boring method.

6.2.4 Continuous flight solid auger method.

6.3 Several drilling methods produce unacceptable borings. The process of jetting through an open tube sampler and then sampling when the desired depth is reached shall not be permitted. The continuous flight solid auger method shall not be used for advancing the boring below a water table or below the upper confining bed of a confined non-cohesive stratum that is under artesian pressure. Casing may not be advanced below the sampling elevation prior to sampling. Advancing a boring with bottom discharge bits is not permissible. It is not permissible to advance the boring for subsequent insertion of the sampler solely by means of previous sampling with the SPT sampler.

6.4 The drilling fluid level within the boring or hollow-stem augers shall be maintained at or above the in situ groundwater level at all times during drilling, removal of drill rods, and sampling.

7. Sampling and Testing Procedure

7.1 After the boring has been advanced to the desired sampling elevation and excessive cuttings have been removed, prepare for the test with the following sequence of operations.

7.1.1 Attach the split-barrel sampler to the sampling rods and lower into borehole. Do not allow the sampler to drop onto the soil to be sampled.

7.1.2 Position the hammer above and attach the anvil to the top of the sampling rods. This may be done before the sampling rods and sampler are lowered into the borehole.

7.1.3 Rest the dead weight of the sampler, rods, anvil, and drive weight on the bottom of the boring and apply a seating blow. If excessive cuttings are encountered at the bottom of the boring, remove the sampler and sampling rods from the boring and remove the cuttings.

7.1.4 Mark the drill rods in three successive 6-in. (0.15-m) increments

so that the advance of the sampler under the impact of the hammer can be easily observed for each 6-in. (0.15-m) increment.

7.2 Drive the sampler with blows from the 140-lb (63.5-kg) hammer and count the number of blows applied in each 6-in. (0.15-m) increment until one of the following occurs:

7.2.1 A total of 50 blows have been applied during any one of the three 6-in. (0.15-m) increments described in 7.1.4.

7.2.2 A total of 100 blows have been applied.

7.2.3 There is no observed advance of the sampler during the application of 10 successive blows of the hammer.

7.2.4 The sampler is advanced the complete 18 in. (0.45 m) without the limiting blow counts occurring as described in 7.2.1, 7.2.2, or 7.2.3.

7.3 Record the number of blows required to effect each 6 in. (0.15m) of penetration or fraction thereof. The first 6 in. is considered to be a seating drive. The sum of the number of blows required for the second and third 6 in. of penetration is termed the "standard penetration resistance", or the "N-value". If the sampler is driven less than 18 in. (0.45 m), as permitted in 7.2.1, 7.2.2, or 7.2.3, the number of blows per each complete 6-in. (0.15-m) increment and per each partial increment shall be recorded on the boring log. For partial increments, the depth of penetration shall be reported to the nearest 1 in. (25 mm), in addition to the number of blows. If the sampler advances below the bottom of the boring under the static weight of the drill rods or the weight of the drill rods plus the static weight of the hammer, this information should be noted on the boring log.

7.4 The raising and dropping of the 140-lb (63.5-kg) hammer shall be accomplished using either of the following two methods:

7.4.1 By using a trip, automatic, or semi-automatic hammer drop system which lifts the 140-lb (63.5-kg) hammer and allows it to drop 30 ± 1.0 in. (0.76 m ± 25 mm) unimpeded.

7.4.2 By using a cathead to pull a rope attached to the hammer. When the cathead and rope method is used the system and operation shall conform to the following:

7.4.2.1 The cathead shall be essentially free of rust, oil, or grease and have a diameter in the range of 6 to 10 in. (150 to 250 mm).

7.4.2.2 The cathead should be operated at a minimum speed of rotation of 100 RPM, or the approximate speed of rotation shall be reported on the boring log.

7.4.2.3 No more than 2¼ rope turns on the cathead may be used during the performance of the penetration test, as shown in Fig. 1.

NOTE 4—The operator should generally use either 1¾ of 2¼ rope turns, depending upon whether or not the rope comes off the top (1¾ turns) or the bottom (2¼ turns) of the cathead. It is generally known and accepted that 2¼ or more rope turns considerably impedes the fall of the hammer and should not be used to perform the test. The cathead rope should be maintained in a relatively dry, clean, and unfrayed condition.

7.4.2.4 For each hammer blow, a 30-in. (0.76-m) lift and drop shall be employed by the operator. The operation of pulling and throwing the rope shall be performed rhythmically without holding the rope at the top of the stroke.

7.5 Bring the sampler to the surface and open. Record the percent recovery or length of sample recovered. Describe the soil samples recovered as to composition, color, stratification, and condition, then place one or more representative portions of the sample into sealable moisture-proof containers (jars) without ramming or distorting any apparent stratification. Seal each container to prevent evaporation of soil moisture. Affix labels to the containers bearing job designation, boring number, sample depth, and the blow count per 6-in. (0.15-m) increment. Protect the samples against extreme temperature changes. If there is a soil change within the sampler, make a jar for each stratum and note its location in the sampler barrel.

8. Report

8.1 Drilling information shall be recorded in the field and shall include the following:

8.1.1 Name and location of job,

8.1.2 Names of crew,

8.1.3 Type and make of drilling machine,

8.1.4 Weather conditions,

8.1.5 Date and time of start and finish of boring,

8.1.6 Boring number and location (station and coordinates, if available and applicable),

8.1.7 Surface elevation, if available,

8.1.8 Method of advancing and cleaning the boring,

8.1.9 Method of keeping boring open,

8.1.10 Depth of water surface and drilling depth at the time of a noted loss of drilling fluid, and time and date when reading or notation was made,

8.1.11 Location of strata changes,

8.1.12 Size of casing, depth of cased portion of boring,

8.1.13 Equipment and method of driving sampler,

8.1.14 Type of sampler and length and inside diameter of barrel (note use of liners),

8.1.15 Size, type, and section length of the sampling rods, and

8.1.16 Remarks.

8.2 Data obtained for each sample shall be recorded in the field and shall include the following:

8.2.1 Sample depth and, if utilized, the sample number,

8.2.2 Description of soil,

8.2.3 Strata changes within sample,

8.2.4 Sampler penetration and recovery lengths, and

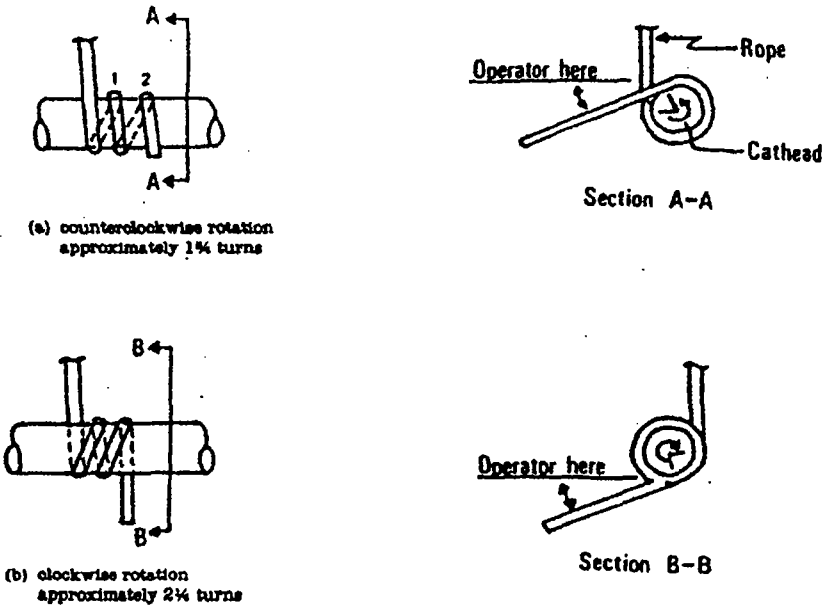
8.2.5 Number of blows per 6-in. (0.15-m) or partial increment.

9. Precision and Bias

9.1 Variations in N-values of 100% or more have been observed when using different standard penetration test apparatus and drillers for adjacent borings in the same soil formation. Current opinion, based on field experience, indicates that when using the same apparatus and driller, N-values in the same soil can be reproduced with a coefficient of variation of about 10%.

9.2 The use of faulty equipment, such as an extremely massive or damaged anvil, a rusty cathead, a low speed cathead, an old, oily rope, or massive or poorly lubricated rope sheaves can significantly contribute to differences in N-values obtained between operator-drill rig systems.

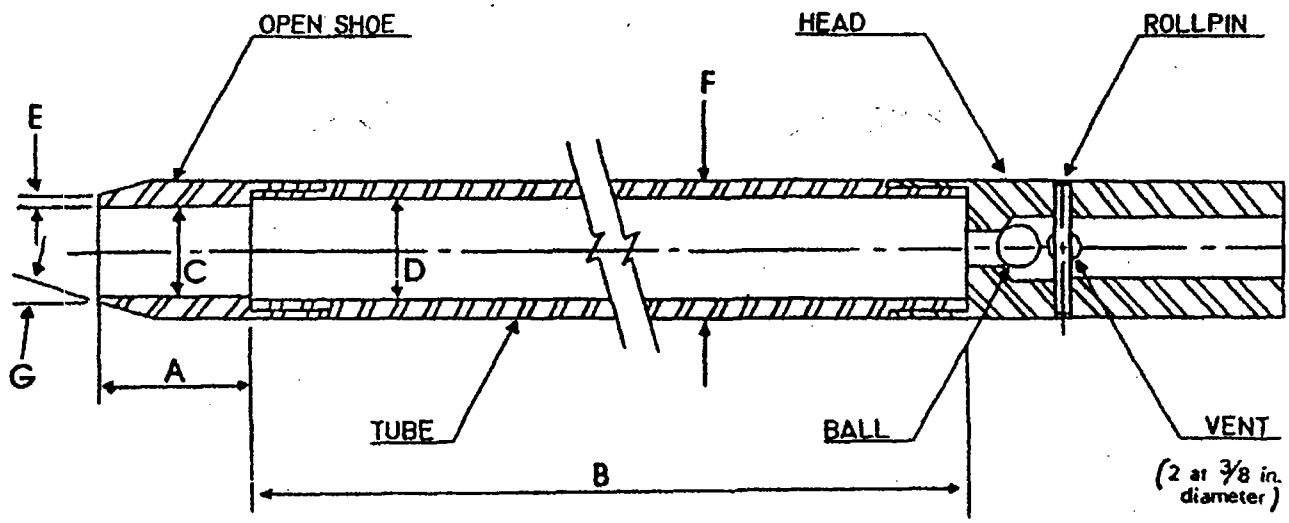
9.3 The variability in N-values produced by different drill rigs and operators may be reduced by measuring that part of the hammer energy delivered into the drill rods from the sampler and adjusting N on the basis of comparative energies. A method for energy measurement and N-value adjustment is currently under development.



(a) counterclockwise rotation approximately 1¾ turns

(b) clockwise rotation approximately 2¼ turns

FIG. 1 Definitions of the Number of Rope Turns and the Angle for (a) Counterclockwise Rotation and (b) Clockwise Rotation of the Cathead



A = 1.0 to 2.0 in. (25 to 50 mm)
B = 18.0 to 30.0 in. (0.457 to 0.762 m)
C = 1.375 ± 0.005 in. (34.93 ± 0.13 mm)
D = 1.50 ± 0.06 – 0.00 in. (38.1 ± 1.5 – 0.0 mm)
E = 0.10 ± 0.02 in. (2.54 ± 0.26 mm)
F = 2.00 ± 0.06 – 0.00 in. (50.8 ± 1.5 – 0.0 mm)
G = 16.0° to 23.0°

The 1⅜ in. (35 mm) inside diameter split barrel may be used with a 16-gage wall thickness split liner. The penetrating end of the drive shoe may be slightly rounded. Metal or plastic retainers may be used to retain soil samples.

FIG. 2 Split-Barrel Sampler

AMERICAN SOCIETY FOR TESTING AND MATERIALS

Standard Practice for

THIN-WALLED TUBE SAMPLING OF SOILS[1]

This standard is issued under the fixed designation D 1587; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of the last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This practice has been approved for use by agencies of the Department of Defense and for listing in the DOD Index of Specifications and Standards.

1. Scope

1.1 This practice covers a procedure for using a thin-walled metal tube to recover relatively undisturbed soil samples suitable for laboratory tests of structural properties. Thin-walled tubes used in piston, plug, or rotary-type samplers, such as the Denison or Pitcher, must comply with the portions of this practice which describe the thin-walled tubes (5.3).

NOTE 1—This practice does not apply to liners used within the above samplers.

2. Applicable Documents

2.1 ASTM Standards:

D2488 Practice for Description and Identification of Soils (Visual-Manual Procedure)[2]

D3550 Practice for Ring-Lined Barrel Sampling of Soils[2]

D4220 Practice for Preserving and Transporting Soil Samples[2]

3. Summary of Practice

3.1 A relatively undisturbed sample is obtained by pressing a thin-walled metal tube into the in-situ soil, removing the soil-filled tube, and sealing the ends to prevent the soil from being disturbed or losing moisture.

4. Significance and Use

4.1 This practice, or Practice D3550, is used when it is necessary to obtain a relatively undisturbed specimen suitable for laboratory tests of structural properties or other tests that might be influenced by soil disturbance.

5. Apparatus

5.1 Drilling Equipment—Any drilling equipment may be used that provides a reasonably clean hole; that does not disturb the soil to be sampled; and that does not hinder the penetration of the thin-walled sampler. Open borehole diameter and the inside diameter of driven casing or hollow stem auger shall not exceed 3.5 times the outside diameter of the thin-walled tube.

5.2 Sampler Insertion Equipment, shall be adequate to provide a relatively rapid continuous penetration force. For hard formations it may be necessary, although not recommended, to drive the thin-walled tube sampler.

5.3 Thin-Walled Tubes, should be manufactured as shown in Fig. 1. They should have an outside diameter of 2 to 5 in. and be made of metal having adequate strength for use in the soil and formation intended. Tubes shall be clean and free of all surface irregularities including projecting weld seams.

5.3.1 Length of Tubes—See Table 1 and 6.4.

5.3.2 Tolerances, shall be within the limits shown in Table 2.

5.3.3 Inside Clearance Ratio, should be 1% or as specified by the engineer or geologist for the soil and formation to be sampled. Generally, the inside clearance ratio used should increase with the increase in plasticity of the soil being sampled. See Fig. 1 for definition of inside clearance ratio.

5.3.4 Corrosion Protection—Corrosion, whether from galvanic or chemical reaction, can damage or destroy both the thin-walled tube and the sample. Severity of damage is a function of time as well as interaction between the sample and the tube. Thin-walled tubes should have some form of protective coating. Tubes which will contain samples for more than 72 h shall be coated. The type of coating to be used may vary depending upon the material to be sampled. Coatings may include a light coat of lubricating oil, lacquer, epoxy, Teflon, and others. Type of coating must be specified by the engineer or geologist if storage will exceed 72 h. Plating of the tubes or alternate base metals may be specified by the engineer or geologist.

5.4 Sampler Head, serves to couple the thin-walled tube to the insertion equipment and, together with the thin-walled tube, comprises the thin-walled tube sampler. The sampler head shall contain a suitable check valve and a venting area to the outside equal to or greater than the area through the check valve. Attachment of the head to the tube shall be concentric and coaxial to assure uniform application of force to the tube by the sampler insertion equipment.

6. Procedure

6.1 Clean out the borehole to sampling elevation using whatever method is preferred that will ensure the material to be sampled is not disturbed. If groundwater is encountered, maintain the liquid level in the borehole at or above ground water level during the sampling operation.

6.2 Bottom discharge bits are not permitted. Side discharge bits may be used, with caution. Jetting through an open-tube sampler to clean out the borehole to sampling elevation is not permitted. Remove loose material from the center of a casing or hollow stem auger as carefully as possible to avoid disturbance of the material to be sampled.

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[1] This practice is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.02 on Sampling and Related Field Testing for Soil Investigation.

Current edition approved Aug. 17, 1983. Published October 1983. Originally published as D 1587-58T. Last previous edition D 1587-74.

[2] Annual Book of ASTM Standards, Vol 04.08.

NOTE 2—Roller bits are available in downward-jetting and diffused-jet configurations. Downward-jetting configuration rock bits are not acceptable. Diffuse-jet configurations are generally acceptable.

6.3 Place the sample tube so that its bottom rests on the bottom of the hole. Advance the sampler without rotation by a continuous relatively rapid motion.

6.4 Determine the length of advance by the resistance and condition of the formation, but the length shall never exceed 6 to 10 diameters of the tube in sands and 10 to 15 diameters of the tube in clays.

NOTE 3—Weight of sample, laboratory handling capabilities, transportation problems, and commercial availability of tubes will generally limit maximum practical lengths to those shown in Table 1.

6.5 When the formation is too hard for push-type insertion, the tube may be driven or Practice D3550 may be used. Other methods, as directed by the engineer or geologist, may be used. If driving methods are used, the data regarding weight and fall of the hammer and penetration achieved must be shown in the report. Additionally, that tube must be prominently labeled a "driven sample."

6.6 In no case shall a length of advance be greater than the sample-tube length minus an allowance for the sampler head and a minimum of 3 in. for sludge-end cuttings.

NOTE 4—The tube may be rotated to shear bottom of the sample after pressing is complete.

6.7 Withdraw the sampler from the formation as carefully as possible in order to minimize disturbance of the sample.

7. Preparation for Shipment

7.1 Upon removal of the tube, measure the length of sample in the tube. Remove the disturbed material in the upper end of the tube and measure the length again. Seal the upper end of the tube. Remove at least 1 in. of material from the lower end of the tube. Use this material for soil description in accordance with Practice D2488. Measure the overall sample length. Seal the lower end of the tube. Alternatively, after measurement, the tube may be sealed without removal of soil from the ends of the tube if so directed by the engineer or geologist.

NOTE 5—Field extrusion and packaging of extruded samples under the specific direction of a geotechnical engineer or geologist is permitted.

NOTE 6—Tubes sealed over the ends as opposed to those sealed with expanding packers should contain end padding in end voids in order to prevent drainage or movement of the sample within the tube.

7.2 Prepare and immediately affix labels or apply markings as necessary to identify the sample. Assure that the markings or labels are adequate to survive transportation and storage.

8. Report

8.1 The appropriate information is required as follows:

8.1.1 Name and location of the project,

8.1.2 Boring number and precise location on project,

8.1.3 Surface elevation or reference to a datum,

8.1.4 Date and time of boring—start and finish,

8.1.5 Depth to top of sample and number of samples,

8.1.6 Description of sampler: size, type of metal, type of coating,

8.1.7 Method of sampler insertion: push or drive,

8.1.8 Method of drilling, size of hole, casing, and drilling fluid used,

8.1.9 Depth to groundwater level: date and time measured,

8.1.10 Any possible current or tidal effect on water level,

8.1.11 Soil description in accordance with Practice D2488,

8.1.12 Length of sampler advance, and

8.1.13 Recovery: length of sample obtained.

9. Precision and Bias

9.1 This practice does not produce numerical data; therefore, a precision and bias statement is not applicable.

TABLE 1 Suitable Thin-Walled Steel Sample Tubes[A]

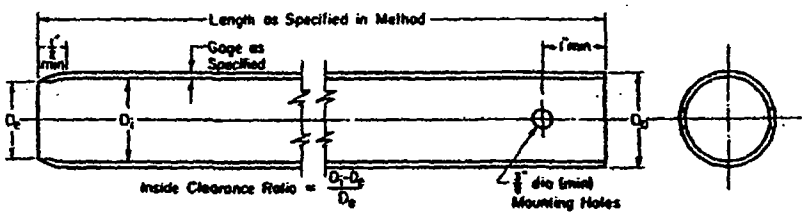
Outside diameter:			
in.	2	3	5
mm	50.8	76.2	127
Wall thickness:			
Bwg	16	16	11
in.	0.049	0.065	0.120
mm	1.24	1.65	3.05
Tube length:			
in.	36	36	64
m	0.91	0.91	1.45
Clearance ratio, %	1	1	1

[A] The three diameters recommended in Table 1 are indicated for purposes of standardization, and are not intended to indicate that sampling tubes of intermediate or larger diameters are not acceptable. Lengths of tubes shown are illustrative. Proper lengths to be determined as suited to field conditions.

TABLE 2 Dimensional Tolerances for Thin-Walled Tubes

Size Outside Diameter	Nominal Tube Diameters from Table 1[A] Tolerances, in.		
	2	3	5
Outside diameter	+0.007	+0.010	+0.015
	−0.000	−0.000	−0.000
Inside diameter	+0.000	+0.000	+0.000
	−0.007	−0.010	−0.015
Wall thickness	±0.007	±0.010	±0.015
Ovality	0.015	0.020	0.030
Straightness	0.030/ft	0.030/ft	0.030/ft

[A] Intermediate or larger diameters should be proportional. Tolerances shown are essentially standard commercial manufacturing tolerances for seamless steel mechanical tubing. Specify only two of the first three tolerances; that is, O.D. and I.D., or O.D. or O.D. and Wall, or I.D. and Wall.



NOTE 1—Minimum of two mounting holes on opposite sides for 2 to 3½ in. sampler.
NOTE 2—Minimum of four mounting holes spaced at 90° for samplers 4 in. and larger.
NOTE 3—Tube held with hardened screws.
NOTE 4—Two-inch outside-diameter tubes are specified with an 18-gage wall thickness to comply with area ratio criteria accepted for "undisturbed samples." Users are advised that such tubing is difficult to locate and can be extremely expensive in small quantities. Sixteen-gage tubes are generally readily available.

Metric Equivalents	
in.	mm
1/10	2.77
½	12.7
1	25.4
2	50.8
3½	88.9
4	101.6

FIG. 1 Thin-Walled Tube for Sampling

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STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14145 SOIL/PROJECT # 25400XH/B-1
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CONFIRMATION ?	N/A	PPM				
BARIUM - EP			0.07	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			<0.5	MG/L	5.0	
SILVER - EP			<0.02	MG/L	5.0	
ARSENIC - EP			<0.010	MG/L	5.0	
SELENIUM - EP			<0.020	MG/L	1.0	
MERCURY - EP			<0.0004	MG/L	0.2	
ACENAPHTHENE	<0.010	PPM				
ACENAPHTYLENE	<0.010	PPM				
ANTHRACENE	<0.010	PPM				
BENZIDINE	<0.010	PPM				
BENZO (A) ANTHRACENE	<0.010	PPM				
BENZO (A) PYRENE	<0.010	PPM				
BENZO(B)FLUORANTHENE	<0.010	PPM				
BENZO(G,H,I)PERYLENE	<0.010	PPM				
BENZO(K)FLUORANTHENE	<0.010	PPM				
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM				
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM				
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM				
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM				
4-BROMOPHENYL PHENYL ETHER	<0.010	PPM				
BUTYL BENZYL PHTHALATE	<0.010	PPM				
2-CHLORONAPHTHALENE	<0.010	PPM				
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM				
CHRYSENE	<0.010	PPM				
DIBENZO(A,H)ANTHRACENE	<0.010	PPM				
1,2-DICHLOROBENZENE	<0.010	PPM				
1,3-DICHLOROBENZENE	<0.010	PPM				
1,4-DICHLOROBENZENE	<0.010	PPM				

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.
TEST METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS, 1982, EPA SW846.
METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT WITH QUESTIONS. REMAINING WASTE SAMPLES WILL BE RETURNED 6 WEEKS FROM THE RECEIVING DATE OF SAMPLE. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT. WI DNR LAB CERTIFICATION #241283020/A.I.H.A. ACCREDITED
N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL

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NORTHBROOK ,IL 60062
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SAMPLE 89052-S14145 SOIL/PROJECT # 25400XH/B-1
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
3,3'-DICHLOROBENZIDINE	<0.010	PPM			
DIETHYL PHTHALATE	<0.010	PPM			
DIMETHYL PHTHALATE	<0.010	PPM			
DI-N-BUTYL PHTHALATE	<0.010	PPM			
2,4-DINITROTOLUENE	<0.010	PPM			
2,6-DINITROTOLUENE	<0.010	PPM			
DI-N-OCTYL PHTHALATE	<0.010	PPM			
1,2-DIPHENYLHYDRAZINE	<0.010	PPM			
FLUORANTHENE	<0.010	PPM			
FLUORENE	<0.010	PPM			
HEXACHLOROBENZENE	<0.010	PPM			
HEXACHLOROBUTADIANE	<0.010	PPM			
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM			
HEXACHLOROETHANE	<0.010	PPM			
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM			
ISOPHORONE	<0.010	PPM			
NAPHTHALENE	<0.010	PPM			
NITROBENZENE	<0.010	PPM			
N-NITROSODIMETHYLAMINE	<0.010	PPM			
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM			
N-NITROSODIPHENYLAMINE	<0.010	PPM			
PHENANTHRENE	<0.010	PPM			
PYRENE	<0.010	PPM			
1,2,4-TRICHLOROBENZENE	<0.010	PPM			
2-CHLOROPHENOL	<0.025	PPM			
2,4-DICHLOROPHENOL	<0.025	PPM			
2,4-DIMETHYLPHENOL	<0.025	PPM			
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM			
2,4-DINITROPHENOL	<0.025	PPM			
2-NITROPHENOL	<0.025	PPM			
4-NITROPHENOL	<0.025	PPM			
4-CHLORO-3-METHYLPHENOL	<0.025	PPM			
PENTACHLOROPHENOL	<0.025	PPM			

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N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL

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SAMPLE 89052-S14145 SOIL/PROJECT # 25400XH/B-1
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
PHENOL	<0.025	PPM			
2,4,6-TRICHLOROPHENOL	<0.025	PPM			
BENZENE	0.014	PPM			
BROMOFORM	<0.001	PPM			
CARBON TETRACHLORIDE	<0.001	PPM			
CHLOROBENZENE	<0.001	PPM			
CHLORODIBROMOMETHANE	<0.001	PPM			
CHLOROETHANE	<0.001	PPM			
2-CHLOROETHYLVINYL ETHER	<0.001	PPM			
CHLOROFORM	<0.001	PPM			
DICHLOROBROMOMETHANE	<0.001	PPM			
DICHLORODIFLUOROMETHANE	<0.001	PPM			
1,1-DICHLOROETHANE	<0.001	PPM			
1,2-DICHLOROETHANE	<0.001	PPM			
1,1-DICHLOROETHYLENE	<0.001	PPM			
1,2-DICHLOROPROPANE	<0.001	PPM			
DICHLOROPROPYLENE (MIXED)	<0.001	PPM			
ETHYLBENZENE	<0.002	PPM			
METHYL BROMIDE	<0.001	PPM			
METHYL CHLORIDE	<0.001	PPM			
METHYLENE CHLORIDE	<0.001	PPM			
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM			
TETRACHLOROETHYLENE	<0.001	PPM			
TOLUENE	0.011	PPM			
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM			
1,1,1-TRICHLOROETHANE	<0.001	PPM			
1,1,2-TRICHLOROETHANE	<0.001	PPM			
TRICHLOROETHYLENE	<0.001	PPM			
TRICHLOROFLUOROMETHANE	<0.001	PPM			
VINYL CHLORIDE	<0.001	PPM			
ALDRIN	<2.0	PPB			
	HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE				
ALPHA-BHC	<2.0	PPB			

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NORTHBROOK ,IL 60062
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SAMPLE 89052-S14145 SOIL/PROJECT # 25400XH/B-1
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
BETA-BHC	<2.0	PPB			
GAMMA-BHC (LINDANE)	<2.0	PPB			
DELTA-BHC	<2.0	PPB			
CHLORDANE	<2.0	PPB			
4,4'-DDT	<0.2	PPB			
4,4'-DDE	<0.2	PPB			
4,4'-DDD	<0.2	PPB			
DIELDRIN	<0.2	PPB			
ENDOSULFAN I	<0.2	PPB			
ENDOSULFAN II	<0.2	PPB			
ENDOSULFAN SULFATE	<0.2	PPB			
ENDRIN	<0.2	PPB			
ENDRIN ALDEHYDE	<0.2	PPB			
HEPTACHLOR	<2.0	PPB			
	HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE				
HEPTACHLOR EPOXIDE	<2.0	PPB			
TOXAPHENE	<2.0	PPB			
PCB'S - SOLIDS, OIL, WASTE	<1.0	PPM			
PCB'S IN WATER	N/T	PPB			
CALCIUM - TOTAL	37000	PPM			
POTASSIUM - TOTAL	240	PPM			
CHLORIDE	<10	PPM			
PH (UNITS)	8.3			2.0-12.5	
	PH DONE ON 10% SOLUTION.				
SULFATE	130	PPM			
TOTAL CYANIDE	<10	PPM			
TOTAL SOLIDS	80	%			
TOTAL KJELDAHL NITROGEN	76	PPM			
TOTAL PHOSPHORUS	26	PPM			

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14105 SOIL/PROJECT # 25400XH/B-2
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CONFIRMATION ?	N/A	PPM				
BARIUM - EP			0.12	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			<0.5	MG/L	5.0	
SILVER - EP			<0.02	MG/L	5.0	
ARSENIC - EP			<0.010	MG/L	5.0	
SELENIUM - EP			<0.020	MG/L	1.0	
MERCURY - EP			<0.0004	MG/L	0.2	
ACENAPHTHENE	<0.010	PPM				
ACENAPHTYLENE	<0.010	PPM				
ANTHRACENE	<0.010	PPM				
BENZIDINE	<0.010	PPM				
BENZO (A) ANTHRACENE	<0.010	PPM				
BENZO (A) PYRENE	<0.010	PPM				
BENZO(B)FLUORANTHENE	<0.010	PPM				
BENZO(G,H,I)PERYLENE	<0.010	PPM				
BENZO(K)FLUORANTHENE	<0.010	PPM				
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM				
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM				
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM				
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM				
4-BROMOPHENYL PHENYL ETHER	<0.010	PPM				
BUTYL BENZYL PHTHALATE	<0.010	PPM				
2-CHLORONAPHTHALENE	<0.010	PPM				
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM				
CHRYSENE	<0.010	PPM				
DIBENZO(A,H)ANTHRACENE	<0.010	PPM				
1,2-DICHLOROBENZENE	<0.010	PPM				
1,3-DICHLOROBENZENE	<0.010	PPM				
1,4-DICHLOROBENZENE	<0.010	PPM				

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TEST METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS, 1982, EPA SW846.
METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT WITH QUESTIONS. REMAINING WASTE SAMPLES WILL BE RETURNED 6 WEEKS FROM THE RECEIVING DATE OF SAMPLE. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT. WI DNR LAB CERTIFICATION #241283020/A.I.H.A. ACCREDITED.
N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL

CHEM-BIO CORPORATION
140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005

ENVIRONMENTAL SERVICES

S080 8432158 W61

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14105 SOIL/PROJECT # 25400XH/B-2
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
3,3'-DICHLOROBENZIDINE	<0.010	PPM			
DIETHYL PHTHALATE	<0.010	PPM			
DIMETHYL PHTHALATE	<0.010	PPM			
DI-N-BUTYL PHTHALATE	<0.010	PPM			
2,4-DINITROTOLUENE	<0.010	PPM			
2,6-DINITROTOLUENE	<0.010	PPM			
DI-N-OCTYL PHTHALATE	<0.010	PPM			
1,2-DIPHENYLHYDRAZINE	<0.010	PPM			
FLUORANTHENE	<0.010	PPM			
FLUORENE	<0.010	PPM			
HEXACHLOROBENZENE	<0.010	PPM			
HEXACHLOROBUTADIANE	<0.010	PPM			
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM			
HEXACHLOROETHANE	<0.010	PPM			
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM			
ISOPHORONE	<0.010	PPM			
NAPHTHALENE	<0.010	PPM			
NITROBENZENE	<0.010	PPM			
N-NITROSODIMETHYLAMINE	<0.010	PPM			
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM			
N-NITROSODIPHENYLAMINE	<0.010	PPM			
PHENANTHRENE	<0.010	PPM			
PYRENE	<0.010	PPM			
1,2,4-TRICHLOROBENZENE	<0.010	PPM			
2-CHLOROPHENOL	<0.025	PPM			
2,4-DICHLOROPHENOL	<0.025	PPM			
2,4-DIMETHYLPHENOL	<0.025	PPM			
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM			
2,4-DINITROPHENOL	<0.025	PPM			
2-NITROPHENOL	<0.025	PPM			
4-NITROPHENOL	<0.025	PPM			
4-CHLORO-3-METHYLPHENOL	<0.025	PPM			
PENTACHLOROPHENOL	<0.025	PPM			

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14105 SOIL/PROJECT # 25400XH/B-2
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
PHENOL	<0.025	PPM			
2,4,6-TRICHLOROPHENOL	<0.025	PPM			
BENZENE	<0.002	PPM			
BROMOFORM	<0.001	PPM			
CARBON TETRACHLORIDE	<0.001	PPM			
CHLOROBENZENE	<0.001	PPM			
CHLORODIBROMOMETHANE	<0.001	PPM			
CHLOROETHANE	<0.001	PPM			
2-CHLOROETHYLVINYL ETHER	<0.001	PPM			
CHLOROFORM	<0.001	PPM			
DICHLOROBROMOMETHANE	<0.001	PPM			
DICHLORODIFLUOROMETHANE	<0.001	PPM			
1,1-DICHLOROETHANE	<0.001	PPM			
1,2-DICHLOROETHANE	<0.001	PPM			
1,1-DICHLOROETHYLENE	<0.001	PPM			
1,2-DICHLOROPROPANE	<0.001	PPM			
DICHLOROPROPYLENE (MIXED)	<0.001	PPM			
ETHYLBENZENE	<0.002	PPM			
METHYL BROMIDE	<0.001	PPM			
METHYL CHLORIDE	<0.001	PPM			
METHYLENE CHLORIDE	0.019	PPM			
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM			
TETRACHLOROETHYLENE	0.001	PPM			
TOLUENE	0.003	PPM			
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM			
1,1,1-TRICHLOROETHANE	<0.001	PPM			
1,1,2-TRICHLOROETHANE	<0.001	PPM			
TRICHLOROETHYLENE	0.006	PPM			
TRICHLOROFLUOROMETHANE	<0.001	PPM			
VINYL CHLORIDE	0.006	PPM			
ALDRIN	<2.0	PPB			
ALPHA-BHC	<2.0	PPB			
BETA-BHC	<2.0	PPB			

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14105 SOIL/PROJECT # 25400XH/B-2
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
GAMMA-BHC (LINDANE)	<2.0	PPB			
DELTA-BHC	<2.0	PPB			
	ELEVATED DETECTION LIMIT - DUE TO SAMPLE MATRIX				
CHLORDANE	<0.2	PPB			
4,4'-DDT	<0.2	PPB			
4,4'-DDE	<0.2	PPB			
4,4'-DDD	<0.2	PPB			
DIELDRIN	<0.2	PPB			
ENDOSULFAN I	<0.2	PPB			
ENDOSULFAN II	<0.2	PPB			
ENDOSULFAN SULFATE	<0.2	PPB			
ENDRIN	<0.2	PPB			
ENDRIN ALDEHYDE	<0.2	PPB			
HEPTACHLOR	<2.0	PPB			
HEPTACHLOR EPOXIDE	<2.0	PPB			
TOXAPHENE	<2.0	PPB			
	ELEVATED DETECTION LIMIT - DUE TO SAMPLE MATRIX				
PCB'S - SOLIDS, OIL, WASTE	<1.0	PPM			
PCB'S IN WATER	N/T	PPB			
CALCIUM - TOTAL	34000	PPM			
POTASSIUM - TOTAL	1300	PPM			
CHLORIDE	190	PPM			
PH (UNITS)	7.3			2.0-12.5	
	PH DONE ON 10% SOLUTION.				
SULFATE	3100	PPM			
TOTAL CYANIDE	<10	PPM			
TOTAL SOLIDS	82	%			
TOTAL KJELDAHL NITROGEN	63	PPM			
TOTAL PHOSPHORUS	22	PPM			

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.
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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14185 SOIL/PROJECT # 25400XH/B-3
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CONFIRMATION ?	NO	PPM				
	DO NOT CONFIRM PER DAVE GRUMMAN 3/14/89 - JS					
BARIUM - EP			<0.05	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			<0.5	MG/L	5.0	
SILVER - EP			<0.02	MG/L	5.0	
ARSENIC - EP			<0.010	MG/L	5.0	
SELENIUM - EP			<0.020	MG/L	1.0	
MERCURY - EP			<0.0004	MG/L	0.2	
ACENAPHTHENE	<0.010	PPM				
ACENAPHTYLENE	2.2	PPM				
ANTHRACENE	4.7	PPM				
BENZIDINE	<0.010	PPM				
BENZO (A) ANTHRACENE	4.2	PPM				
BENZO (A) PYRENE	<0.010	PPM				
BENZO(B)FLUORANTHENE	<0.010	PPM				
BENZO(G,H,I)PERYLENE	<0.010	PPM				
BENZO(K)FLUORANTHENE	<0.010	PPM				
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM				
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM				
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM				
BIS (2-ETHYLHEXYL) PHTHALA	5.0	PPM				
4-BROMOPHENYL PHENYL ETHER	4.5	PPM				
BUTYL BENZYL PHTHALATE	35	PPM				
2-CHLORONAPHTHALENE	<0.010	PPM				
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM				
CHRYSENE	<0.010	PPM				
DIBENZO(A,H)ANTHRACENE	<0.010	PPM				
1,2-DICHLOROBENZENE	<0.010	PPM				
1,3-DICHLOROBENZENE	<0.010	PPM				

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.
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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14185 SOIL/PROJECT # 25400XH/B-3
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
1,4-DICHLOROBENZENE	<0.010	PPM			
3,3'-DICHLOROBENZIDINE	<0.010	PPM			
DIETHYL PHTHALATE	<0.010	PPM			
DIMETHYL PHTHALATE	<0.010	PPM			
DI-N-BUTYL PHTHALATE	<0.010	PPM			
2,4-DINITROTOLUENE	<0.010	PPM			
2,6-DINITROTOLUENE	3.4	PPM			
DI-N-OCTYL PHTHALATE	0.11	PPM			
1,2-DIPHENYLHYDRAZINE	0.76	PPM			
FLUORANTHENE	<0.010	PPM			
FLUORENE	0.34	PPM			
HEXACHLOROBENZENE	<0.010	PPM			
HEXACHLOROBUTADIANE	<0.010	PPM			
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM			
HEXACHLOROETHANE	<0.010	PPM			
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM			
ISOPHORONE	3.7	PPM			
NAPHTHALENE	<0.010	PPM			
NITROBENZENE	<0.010	PPM			
N-NITROSODIMETHYLAMINE	<0.010	PPM			
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM			
N-NITROSODIPHENYLAMINE	<0.010	PPM			
PHENANTHRENE	0.43	PPM			
PYRENE	3.5	PPM			
1,2,4-TRICHLOROBENZENE	<0.010	PPM			
2-CHLOROPHENOL	<0.025	PPM			
2,4-DICHLOROPHENOL	<0.025	PPM			
2,4-DIMETHYLPHENOL	<0.025	PPM			
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM			
2,4-DINITROPHENOL	<0.025	PPM			
2-NITROPHENOL	<0.025	PPM			
4-NITROPHENOL	<0.025	PPM			
4-CHLORO-3-METHYLPHENOL	<0.025	PPM			

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14185 SOIL/PROJECT # 25400XH/B-3
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
PENTACHLOROPHENOL	<0.025	PPM			
PHENOL	<0.025	PPM			
2,4,6-TRICHLOROPHENOL	<0.025	PPM			
BENZENE	0.22	PPM			
BROMOFORM	<0.001	PPM			
CARBON TETRACHLORIDE	<0.001	PPM			
CHLOROBENZENE	<0.001	PPM			
CHLORODIBROMOMETHANE	<0.001	PPM			
CHLOROETHANE	<0.001	PPM			
2-CHLOROETHYLVINYL ETHER	<0.001	PPM			
CHLOROFORM	0.006	PPM			
DICHLOROBROMOMETHANE	<0.001	PPM			
DICHLORODIFLUOROMETHANE	<0.001	PPM			
1,1-DICHLOROETHANE	<0.001	PPM			
1,2-DICHLOROETHANE	0.001	PPM			
1,1-DICHLOROETHYLENE	<0.001	PPM			
1,2-DICHLOROPROPANE	<0.001	PPM			
DICHLOROPROPYLENE (MIXED)	<0.001	PPM			
ETHYLBENZENE	<0.002	PPM			
METHYL BROMIDE	<0.001	PPM			
METHYL CHLORIDE	<0.001	PPM			
METHYLENE CHLORIDE	0.086	PPM			
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM			
TETRACHLOROETHYLENE	0.002	PPM			
TOLUENE	0.071	PPM			
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM			
1,1,1-TRICHLOROETHANE	0.002	PPM			
1,1,2-TRICHLOROETHANE	<0.001	PPM			
TRICHLOROETHYLENE	<0.001	PPM			
TRICHLOROFLUOROMETHANE	<0.001	PPM			
VINYL CHLORIDE	0.009	PPM			
ALDRIN	<20	PPB			

HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE

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NORTHBROOK ,IL 60062
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SAMPLE 89052-S14185 SOIL/PROJECT # 25400XH/B-3
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
ALPHA-BHC	<20	PPB			
BETA-BHC	<20	PPB			
GAMMA-BHC (LINDANE)	<20	PPB			
DELTA-BHC	<20	PPB			
CHLORDANE	<20	PPB			
4,4'-DDT	<20	PPB			
4,4'-DDE	<20	PPB			
4,4'-DDD	<20	PPB			
DIELDRIN	<20	PPB			
	HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE				
ENDOSULFAN I	<20	PPB			
ENDOSULFAN II	<20	PPB			
ENDOSULFAN SULFATE	<20	PPB			
ENDRIN	<20	PPB			
ENDRIN ALDEHYDE	<20	PPB			
HEPTACHLOR	<20	PPB			
HEPTACHLOR EPOXIDE	<20	PPB			
TOXAPHENE	<20	PPB			
PCB'S - SOLIDS, OIL, WASTE	<2.0	PPM			
	HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE				
PCB'S IN WATER	N/T	PPB			
CALCIUM - TOTAL	5900	PPM			
POTASSIUM - TOTAL	49	PPM			
CHLORIDE	940	PPM			
PH (UNITS)	7.2			2.0-12.5	
	PH DONE ON 10% SOLUTION.				
SULFATE	170	PPM			
TOTAL CYANIDE	<10	PPM			
TOTAL SOLIDS	31	%			
TOTAL KJELDAHL NITROGEN	150	PPM			
TOTAL PHOSPHORUS	13	PPM			

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SAMPLE 89052-S14147 SOIL/PROJECT # 25400XH/B-4
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CONFIRMATION ?	NO	PPM				
	DO NOT CONFIRM PER DAVE GRUMMAN 3/14/89 - JS					
BARIUM - EP			0.08	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			<0.5	MG/L	5.0	
SILVER - EP			<0.02	MG/L	5.0	
ARSENIC - EP			<0.010	MG/L	5.0	
SELENIUM - EP			<0.020	MG/L	1.0	
MERCURY - EP			<0.0004	MG/L	0.2	
ACENAPHTHENE	<0.010	PPM				
ACENAPHTYLENE	<0.010	PPM				
ANTHRACENE	<0.010	PPM				
BENZIDINE	<0.010	PPM				
BENZO (A) ANTHRACENE	<0.010	PPM				
BENZO (A) PYRENE	<0.010	PPM				
BENZO(B)FLUORANTHENE	<0.010	PPM				
BENZO(G,H,I)PERYLENE	<0.010	PPM				
BENZO(K)FLUORANTHENE	<0.010	PPM				
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM				
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM				
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM				
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM				
4-BROMOPHENYL PHENYL ETHER	<0.010	PPM				
BUTYL BENZYL PHTHALATE	<0.010	PPM				
2-CHLORONAPHTHALENE	<0.010	PPM				
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM				
CHRYSENE	<0.010	PPM				
DIBENZO(A,H)ANTHRACENE	<0.010	PPM				
1,2-DICHLOROBENZENE	<0.010	PPM				
1,3-DICHLOROBENZENE	<0.010	PPM				

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14147 SOIL/PROJECT # 25400XH/B-4
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
1,4-DICHLOROBENZENE	<0.010	PPM			
3,3'-DICHLOROBENZIDINE	<0.010	PPM			
DIETHYL PHTHALATE	<0.010	PPM			
DIMETHYL PHTHALATE	<0.010	PPM			
DI-N-BUTYL PHTHALATE	<0.010	PPM			
2,4-DINITROTOLUENE	<0.010	PPM			
2,6-DINITROTOLUENE	<0.010	PPM			
DI-N-OCTYL PHTHALATE	<0.010	PPM			
1,2-DIPHENYLHYDRAZINE	<0.010	PPM			
FLUORANTHENE	<0.010	PPM			
FLUORENE	<0.010	PPM			
HEXACHLOROBENZENE	<0.010	PPM			
HEXACHLOROBUTADIANE	<0.010	PPM			
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM			
HEXACHLOROETHANE	<0.010	PPM			
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM			
ISOPHORONE	<0.010	PPM			
NAPHTHALENE	<0.010	PPM			
NITROBENZENE	<0.010	PPM			
N-NITROSODIMETHYLAMINE	<0.010	PPM			
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM			
N-NITROSODIPHENYLAMINE	<0.010	PPM			
PHENANTHRENE	<0.010	PPM			
PYRENE	<0.010	PPM			
1,2,4-TRICHLOROBENZENE	<0.010	PPM			
2-CHLOROPHENOL	<0.025	PPM			
2,4-DICHLOROPHENOL	<0.025	PPM			
2,4-DIMETHYLPHENOL	<0.025	PPM			
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM			
2,4-DINITROPHENOL	<0.025	PPM			
2-NITROPHENOL	<0.025	PPM			
4-NITROPHENOL	<0.025	PPM			
4-CHLORO-3-METHYLPHENOL	<0.025	PPM			

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233,
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CHEM-BIO CORPORATION
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ENVIRONMENTAL SERVICES

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STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14147 SOIL/PROJECT # 25400XH/B-4
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
PENTACHLOROPHENOL	<0.025	PPM			
PHENOL	<0.025	PPM			
2,4,6-TRICHLOROPHENOL	<0.025	PPM			
BENZENE	<0.002	PPM			
BROMOFORM	<0.001	PPM			
CARBON TETRACHLORIDE	0.16	PPM			
CHLOROBENZENE	<0.001	PPM			
CHLORODIBROMOMETHANE	<0.001	PPM			
CHLOROETHANE	<0.001	PPM			
2-CHLOROETHYLVINYL ETHER	<0.001	PPM			
CHLOROFORM	0.12	PPM			
DICHLOROBROMOMETHANE	<0.001	PPM			
DICHLORODIFLUOROMETHANE	<0.001	PPM			
1,1-DICHLOROETHANE	<0.001	PPM			
1,2-DICHLOROETHANE	0.27	PPM			
1,1-DICHLOROETHYLENE	<0.001	PPM			
1,2-DICHLOROPROPANE	<0.001	PPM			
DICHLOROPROPYLENE (MIXED)	<0.001	PPM			
ETHYLBENZENE	<0.002	PPM			
METHYL BROMIDE	<0.001	PPM			
METHYL CHLORIDE	<0.001	PPM			
METHYLENE CHLORIDE	0.15	PPM			
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM			
TETRACHLOROETHYLENE	0.076	PPM			
TOLUENE	0.037	PPM			
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM			
1,1,1-TRICHLOROETHANE	<0.001	PPM			
1,1,2-TRICHLOROETHANE	<0.001	PPM			
TRICHLOROETHYLENE	0.046	PPM			
TRICHLOROFLUOROMETHANE	<0.001	PPM			
VINYL CHLORIDE	0.018	PPM			
ALDRIN	<20	PPB			

HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14100 SOIL/PROJECT # 25400XH/B-5
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CONFIRMATION ?	N/A	PPM				
BARIUM - EP			0.25	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			<0.5	MG/L	5.0	
SILVER - EP			<0.02	MG/L	5.0	
ARSENIC - EP			<0.010	MG/L	5.0	
SELENIUM - EP			<0.020	MG/L	1.0	
MERCURY - EP			<0.0004	MG/L	0.2	
ACENAPHTHENE	<0.010	PPM				
ACENAPHTYLENE	<0.010	PPM				
ANTHRACENE	<0.010	PPM				
BENZIDINE	<0.010	PPM				
BENZO (A) ANTHRACENE	<0.010	PPM				
BENZO (A) PYRENE	<0.010	PPM				
BENZO(B)FLUORANTHENE	<0.010	PPM				
BENZO(G,H,I)PERYLENE	<0.010	PPM				
BENZO(K)FLUORANTHENE	<0.010	PPM				
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM				
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM				
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM				
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM				
4-BROMOPHENYL PHENYL ETHER	<0.010	PPM				
BUTYL BENZYL PHTHALATE	<0.010	PPM				
2-CHLORONAPHTHALENE	<0.010	PPM				
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM				
CHRYSENE	<0.010	PPM				
DIBENZO(A,H)ANTHRACENE	<0.010	PPM				
1,2-DICHLOROBENZENE	<0.010	PPM				
1,3-DICHLOROBENZENE	<0.010	PPM				
1,4-DICHLOROBENZENE	<0.010	PPM				

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.
TEST METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS, 1982, EPA SW846.
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ENVIRONMENTAL SERVICES

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14100 SOIL/PROJECT # 25400XH/B-5
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
3,3'-DICHLOROBENZIDINE	<0.010	PPM			
DIETHYL PHTHALATE	<0.010	PPM			
DIMETHYL PHTHALATE	<0.010	PPM			
DI-N-BUTYL PHTHALATE	<0.010	PPM			
2,4-DINITROTOLUENE	<0.010	PPM			
2,6-DINITROTOLUENE	<0.010	PPM			
DI-N-OCTYL PHTHALATE	<0.010	PPM			
1,2-DIPHENYLHYDRAZINE	<0.010	PPM			
FLUORANTHENE	<0.010	PPM			
FLUORENE	<0.010	PPM			
HEXACHLOROBENZENE	<0.010	PPM			
HEXACHLOROBUTADIANE	<0.010	PPM			
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM			
HEXACHLOROETHANE	<0.010	PPM			
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM			
ISOPHORONE	<0.010	PPM			
NAPHTHALENE	<0.010	PPM			
NITROBENZENE	<0.010	PPM			
N-NITROSODIMETHYLAMINE	<0.010	PPM			
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM			
N-NITROSODIPHENYLAMINE	<0.010	PPM			
PHENANTHRENE	<0.010	PPM			
PYRENE	<0.010	PPM			
1,2,4-TRICHLOROBENZENE	<0.010	PPM			
2-CHLOROPHENOL	<0.025	PPM			
2,4-DICHLOROPHENOL	<0.025	PPM			
2,4-DIMETHYLPHENOL	<0.025	PPM			
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM			
2,4-DINITROPHENOL	<0.025	PPM			
2-NITROPHENOL	<0.025	PPM			
4-NITROPHENOL	<0.025	PPM			
4-CHLORO-3-METHYLPHENOL	<0.025	PPM			
PENTACHLOROPHENOL	<0.025	PPM			

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111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14100 SOIL/PROJECT # 25400XH/B-5
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
PHENOL	<0.025	PPM			
2,4,6-TRICHLOROPHENOL	<0.025	PPM			
BENZENE	<0.002	PPM			
BROMOFORM	<0.001	PPM			
CARBON TETRACHLORIDE	<0.001	PPM			
CHLOROBENZENE	<0.001	PPM			
CHLORODIBROMOMETHANE	<0.001	PPM			
CHLOROETHANE	<0.001	PPM			
2-CHLOROETHYLVINYL ETHER	<0.001	PPM			
CHLOROFORM	<0.001	PPM			
DICHLOROBROMOMETHANE	<0.001	PPM			
DICHLORODIFLUOROMETHANE	<0.001	PPM			
1,1-DICHLOROETHANE	<0.001	PPM			
1,2-DICHLOROETHANE	0.003	PPM			
1,1-DICHLOROETHYLENE	<0.001	PPM			
1,2-DICHLOROPROPANE	<0.001	PPM			
DICHLOROPROPYLENE (MIXED)	<0.001	PPM			
ETHYLBENZENE	<0.002	PPM			
METHYL BROMIDE	<0.001	PPM			
METHYL CHLORIDE	<0.001	PPM			
METHYLENE CHLORIDE	0.087	PPM			
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM			
TETRACHLOROETHYLENE	0.008	PPM			
TOLUENE	0.037	PPM			
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM			
1,1,1-TRICHLOROETHANE	<0.001	PPM			
1,1,2-TRICHLOROETHANE	<0.001	PPM			
TRICHLOROETHYLENE	<0.001	PPM			
TRICHLOROFLUOROMETHANE	<0.001	PPM			
VINYL CHLORIDE	0.009	PPM			
ALDRIN	<2.0	PPB			
ALPHA-BHC	<2.0	PPB			
BETA-BHC	<2.0	PPB			

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14100 SOIL/PROJECT # 25400XH/B-5
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
GAMMA-BHC (LINDANE)	<2.0	PPB			
DELTA-BHC	<2.0	PPB			
	ELEVATED DETECTION LIMIT - DUE TO SAMPLE MATRIX				
CHLORDANE	<0.2	PPB			
4,4'-DDT	<0.2	PPB			
4,4'-DDE	<0.2	PPB			
4,4'-DDD	<0.2	PPB			
DIELDRIN	<0.2	PPB			
ENDOSULFAN I	<0.2	PPB			
ENDOSULFAN II	<0.2	PPB			
ENDOSULFAN SULFATE	<0.2	PPB			
ENDRIN	<0.2	PPB			
ENDRIN ALDEHYDE	<0.2	PPB			
HEPTACHLOR	<2.0	PPB			
HEPTACHLOR EPOXIDE	<2.0	PPB			
TOXAPHENE	<2.0	PPB			
	ELEVATED DETECTION LIMIT - DUE TO SAMPLE MATRIX				
PCB'S - SOLIDS, OIL, WASTE	<1.0	PPM			
PCB'S IN WATER	N/T	PPB			
CALCIUM - TOTAL	26000	PPM			
POTASSIUM - TOTAL	1500	PPM			
CHLORIDE	170	PPM			
PH (UNITS)	8.1			2.0-12.5	
	PH DONE ON 10% SOLUTION.				
SULFATE	950	PPM			
TOTAL CYANIDE	<10	PPM			
TOTAL SOLIDS	81	%			
TOTAL KJELDAHL NITROGEN	<50	PPM			
TOTAL PHOSPHORUS	14	PPM			

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ENVIRONMENTAL SERVICES

03/17/89 LABORATORY REPORT

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111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14106 SOIL/PROJECT # 25400XH/B-6
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CONFIRMATION ?	YES PER D. GRUMMAN 3/6	PPM				
BARIUM - EP			0.10	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			<0.5	MG/L	5.0	
SILVER - EP			<0.02	MG/L	5.0	
ARSENIC - EP			<0.010	MG/L	5.0	
SELENIUM - EP			<0.020	MG/L	1.0	
MERCURY - EP			<0.0004	MG/L	0.2	
ACENAPHTHENE	<0.010	PPM				
ACENAPHTYLENE	<0.010	PPM				
ANTHRACENE	<0.010	PPM				
BENZIDINE	<0.010	PPM				
BENZO (A) ANTHRACENE	3.9	PPM				
BENZO (A) PYRENE	3.5	PPM				
BENZO(B)FLUORANTHENE	<0.010	PPM				
BENZO(G,H,I)PERYLENE	<0.010	PPM				
BENZO(K)FLUORANTHENE	<0.010	PPM				
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM				
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM				
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM				
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM				
4-BROMOPHENYL PHENYL ETHER	<0.010	PPM				
BUTYL BENZYL PHTHALATE	<0.010	PPM				
2-CHLORONAPHTHALENE	<0.010	PPM				
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM				
CHRYSENE	4.1	PPM				
DIBENZO(A,H)ANTHRACENE	2.4	PPM				
1,2-DICHLOROBENZENE	<0.010	PPM				
1,3-DICHLOROBENZENE	<0.010	PPM				

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14106 SOIL/PROJECT # 25400XH/B-6
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
1,4-DICHLOROBENZENE	<0.010	PPM			
3,3'-DICHLOROBENZIDINE	<0.010	PPM			
DIETHYL PHTHALATE	<0.010	PPM			
DIMETHYL PHTHALATE	<0.010	PPM			
DI-N-BUTYL PHTHALATE	<0.010	PPM			
2,4-DINITROTOLUENE	<0.010	PPM			
2,6-DINITROTOLUENE	<0.010	PPM			
DI-N-OCTYL PHTHALATE	<0.010	PPM			
1,2-DIPHENYLHYDRAZINE	<0.010	PPM			
FLUORANTHENE	7.1	PPM			
FLUORENE	<0.010	PPM			
HEXACHLOROBENZENE	<0.010	PPM			
HEXACHLOROBUTADIANE	<0.010	PPM			
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM			
HEXACHLOROETHANE	<0.010	PPM			
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM			
ISOPHORONE	<0.010	PPM			
NAPHTHALENE	<0.010	PPM			
NITROBENZENE	<0.010	PPM			
N-NITROSODIMETHYLAMINE	<0.010	PPM			
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM			
N-NITROSODIPHENYLAMINE	<0.010	PPM			
PHENANTHRENE	8.8	PPM			
PYRENE	6.7	PPM			
1,2,4-TRICHLOROBENZENE	<0.010	PPM			
2-CHLOROPHENOL	<0.025	PPM			
2,4-DICHLOROPHENOL	<0.025	PPM			
2,4-DIMETHYLPHENOL	<0.025	PPM			
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM			
2,4-DINITROPHENOL	<0.025	PPM			
2-NITROPHENOL	<0.025	PPM			
4-NITROPHENOL	<0.025	PPM			
4-CHLORO-3-METHYLPHENOL	<0.025	PPM			

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STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14106 SOIL/PROJECT # 25400XH/B-6
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
PENTACHLOROPHENOL	<0.025	PPM			
PHENOL	<0.025	PPM			
2,4,6-TRICHLOROPHENOL	<0.025	PPM			
BENZENE	0.19	PPM			
BROMOFORM	<0.001	PPM			
CARBON TETRACHLORIDE	<0.001	PPM			
CHLOROBENZENE	<0.001	PPM			
CHLORODIBROMOMETHANE	<0.001	PPM			
CHLOROETHANE	<0.001	PPM			
2-CHLOROETHYLVINYL ETHER	<0.001	PPM			
CHLOROFORM	0.003	PPM			
DICHLOROBROMOMETHANE	<0.001	PPM			
DICHLORODIFLUOROMETHANE	<0.001	PPM			
1,1-DICHLOROETHANE	<0.001	PPM			
1,2-DICHLOROETHANE	0.005	PPM			
1,1-DICHLOROETHYLENE	<0.001	PPM			
1,2-DICHLOROPROPANE	<0.001	PPM			
DICHLOROPROPYLENE (MIXED)	<0.001	PPM			
ETHYLBENZENE	0.009	PPM			
METHYL BROMIDE	<0.001	PPM			
METHYL CHLORIDE	<0.001	PPM			
METHYLENE CHLORIDE	0.008	PPM			
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM			
TETRACHLOROETHYLENE	0.004	PPM			
TOLUENE	0.038	PPM			
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM			
1,1,1-TRICHLOROETHANE	0.001	PPM			
1,1,2-TRICHLOROETHANE	<0.001	PPM			
TRICHLOROETHYLENE	0.002	PPM			
TRICHLOROFLUOROMETHANE	0.055	PPM			
VINYL CHLORIDE	<0.001	PPM			
ALDRIN	<20	PPB			
ALPHA-BHC	<20	PPB			

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL

CHEM-BIO CORPORATION
ENVIRONMENTAL SERVICES
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S080 8432158 W61

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14106 SOIL/PROJECT # 25400XH/B-6
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
BETA-BHC	<20	PPB			
GAMMA-BHC (LINDANE)	<20	PPB			
DELTA-BHC	<20	PPB			
CHLORDANE	<20	PPB			
4,4'-DDT	<20	PPB			
4,4'-DDE	<20	PPB			
4,4'-DDD	<20	PPB			
	ELEVATED DETECTION LIMIT - DUE TO SAMPLE MATRIX				
DIELDRIN	<20	PPB			
ENDOSULFAN I	<20	PPB			
ENDOSULFAN II	<20	PPB			
ENDOSULFAN SULFATE	<20	PPB			
ENDRIN	<20	PPB			
ENDRIN ALDEHYDE	<20	PPB			
HEPTACHLOR	<20	PPB			
HEPTACHLOR EPOXIDE	<20	PPB			
TOXAPHENE	<20	PPB			
	ELEVATED DETECTION LIMIT - DUE TO SAMPLE MATRIX				
PCB'S - SOLIDS, OIL, WASTE	<10	PPM			
	ELEVATED DETECTION LIMIT - DUE TO SAMPLE MATRIX				
PCB'S IN WATER	N/T	PPB			
CALCIUM - TOTAL	45000	PPM			
POTASSIUM - TOTAL	800	PPM			
CHLORIDE	110	PPM			
PH (UNITS)	8.8			2.0-12.5	
	PH DONE ON 10% SOLUTION.				
SULFATE	530	PPM			
TOTAL CYANIDE	<10	PPM			
TOTAL SOLIDS	90	%			
TOTAL KJELDAHL NITROGEN	100	PPM			
TOTAL PHOSPHORUS	420	PPM			

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.
TEST METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS, 1982, EPA SW846.
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03/17/89 LABORATORY REPORT

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14186 SOIL/PROJECT # 25400XH/B-7
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CONFIRMATION ?	NO	PPM				
	DO NOT CONFIRM PER DAVE GRUMMAN 3/14/89 - JS					
BARIUM - EP			0.23	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			0.6	MG/L	5.0	
SILVER - EP			<0.02	MG/L	5.0	
ARSENIC - EP			<0.010	MG/L	5.0	
SELENIUM - EP			<0.020	MG/L	1.0	
MERCURY - EP			0.0006	MG/L	0.2	
ACENAPHTHENE	<0.010	PPM				
ACENAPHTYLENE	<0.010	PPM				
ANTHRACENE	<0.010	PPM				
BENZIDINE	<0.010	PPM				
BENZO (A) ANTHRACENE	2.9	PPM				
BENZO (A) PYRENE	1.8	PPM				
BENZO(B)FLUORANTHENE	1.8	PPM				
BENZO(G,H,I)PERYLENE	<0.010	PPM				
BENZO(K)FLUORANTHENE	<0.010	PPM				
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM				
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM				
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM				
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM				
4-BROMOPHENYL PHENYL ETHER	<0.010	PPM				
BUTYL BENZYL PHTHALATE	<0.010	PPM				
2-CHLORONAPHTHALENE	<0.010	PPM				
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM				
CHRYSENE	<0.010	PPM				
DIBENZO(A,H)ANTHRACENE	<0.010	PPM				
1,2-DICHLOROBENZENE	<0.010	PPM				
1,3-DICHLOROBENZENE	<0.010	PPM				

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.
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STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14186 SOIL/PROJECT # 25400XH/B-7
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
1,4-DICHLOROBENZENE	<0.010	PPM			
3,3'-DICHLOROBENZIDINE	<0.010	PPM			
DIETHYL PHTHALATE	<0.010	PPM			
DIMETHYL PHTHALATE	<0.010	PPM			
DI-N-BUTYL PHTHALATE	<0.010	PPM			
2,4-DINITROTOLUENE	<0.010	PPM			
2,6-DINITROTOLUENE	<0.010	PPM			
DI-N-OCTYL PHTHALATE	<0.010	PPM			
1,2-DIPHENYLHYDRAZINE	<0.010	PPM			
FLUORANTHENE	<0.010	PPM			
FLUORENE	<0.010	PPM			
HEXACHLOROBENZENE	<0.010	PPM			
HEXACHLOROBUTADIANE	<0.010	PPM			
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM			
HEXACHLOROETHANE	<0.010	PPM			
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM			
ISOPHORONE	<0.010	PPM			
NAPHTHALENE	<0.010	PPM			
NITROBENZENE	<0.010	PPM			
N-NITROSODIMETHYLAMINE	<0.010	PPM			
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM			
N-NITROSODIPHENYLAMINE	<0.010	PPM			
PHENANTHRENE	<0.010	PPM			
PYRENE	<0.010	PPM			
1,2,4-TRICHLOROBENZENE	<0.010	PPM			
2-CHLOROPHENOL	<0.025	PPM			
2,4-DICHLOROPHENOL	<0.025	PPM			
2,4-DIMETHYLPHENOL	<0.025	PPM			
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM			
2,4-DINITROPHENOL	<0.025	PPM			
2-NITROPHENOL	<0.025	PPM			
4-NITROPHENOL	<0.025	PPM			
4-CHLORO-3-METHYLPHENOL	<0.025	PPM			

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14186 SOIL/PROJECT # 25400XH/B-7
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
PENTACHLOROPHENOL	<0.025	PPM			
PHENOL	<0.025	PPM			
2,4,6-TRICHLOROPHENOL	<0.025	PPM			
BENZENE	<0.002	PPM			
BROMOFORM	<0.001	PPM			
CARBON TETRACHLORIDE	<0.001	PPM			
CHLOROBENZENE	<0.001	PPM			
CHLORODIBROMOMETHANE	<0.001	PPM			
CHLOROETHANE	<0.001	PPM			
2-CHLOROETHYLVINYL ETHER	<0.001	PPM			
CHLOROFORM	0.008	PPM			
DICHLOROBROMOMETHANE	<0.001	PPM			
DICHLORODIFLUOROMETHANE	<0.001	PPM			
1,1-DICHLOROETHANE	<0.001	PPM			
1,2-DICHLOROETHANE	0.006	PPM			
1,1-DICHLOROETHYLENE	<0.001	PPM			
1,2-DICHLOROPROPANE	<0.001	PPM			
DICHLOROPROPYLENE (MIXED)	<0.001	PPM			
ETHYLBENZENE	0.070	PPM			
METHYL BROMIDE	<0.001	PPM			
METHYL CHLORIDE	<0.001	PPM			
METHYLENE CHLORIDE	0.18	PPM			
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM			
TETRACHLOROETHYLENE	0.003	PPM			
TOLUENE	0.22	PPM			
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM			
1,1,1-TRICHLOROETHANE	0.001	PPM			
1,1,2-TRICHLOROETHANE	<0.001	PPM			
TRICHLOROETHYLENE	0.002	PPM			
TRICHLOROFLUOROMETHANE	<0.001	PPM			
VINYL CHLORIDE	0.005	PPM			
ALDRIN	<2.0	PPB			

HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE

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CHEM-BIO CORPORATION
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ENVIRONMENTAL SERVICES

03/17/89 LABORATORY REPORT

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STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14101 SOIL/PROJECT # 25400XH/B-8
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CONFIRMATION ?	N/A	PPM				
BARIUM - EP			0.11	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			<0.5	MG/L	5.0	
SILVER - EP			<0.02	MG/L	5.0	
ARSENIC - EP			<0.010	MG/L	5.0	
SELENIUM - EP			<0.020	MG/L	1.0	
MERCURY - EP			<0.0004	MG/L	0.2	
ACENAPHTHENE	<0.010	PPM				
ACENAPHTYLENE	<0.010	PPM				
ANTHRACENE	<0.010	PPM				
BENZIDINE	<0.010	PPM				
BENZO (A) ANTHRACENE	<0.010	PPM				
BENZO (A) PYRENE	<0.010	PPM				
BENZO(B)FLUORANTHENE	<0.010	PPM				
BENZO(G,H,I)PERYLENE	<0.010	PPM				
BENZO(K)FLUORANTHENE	<0.010	PPM				
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM				
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM				
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM				
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM				
4-BROMOPHENYL PHENYL ETHER	<0.010	PPM				
BUTYL BENZYL PHTHALATE	<0.010	PPM				
2-CHLORONAPHTHALENE	<0.010	PPM				
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM				
CHRYSENE	<0.010	PPM				
DIBENZO(A,H)ANTHRACENE	<0.010	PPM				
1,2-DICHLOROBENZENE	<0.010	PPM				
1,3-DICHLOROBENZENE	<0.010	PPM				
1,4-DICHLOROBENZENE	<0.010	PPM				

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111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14101 SOIL/PROJECT # 25400XH/B-8
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
3,3'-DICHLOROBENZIDINE	<0.010	PPM			
DIETHYL PHTHALATE	<0.010	PPM			
DIMETHYL PHTHALATE	<0.010	PPM			
DI-N-BUTYL PHTHALATE	<0.010	PPM			
2,4-DINITROTOLUENE	<0.010	PPM			
2,6-DINITROTOLUENE	<0.010	PPM			
DI-N-OCTYL PHTHALATE	<0.010	PPM			
1,2-DIPHENYLHYDRAZINE	<0.010	PPM			
FLUORANTHENE	<0.010	PPM			
FLUORENE	<0.010	PPM			
HEXACHLOROBENZENE	<0.010	PPM			
HEXACHLOROBUTADIANE	<0.010	PPM			
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM			
HEXACHLOROETHANE	<0.010	PPM			
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM			
ISOPHORONE	<0.010	PPM			
NAPHTHALENE	<0.010	PPM			
NITROBENZENE	<0.010	PPM			
N-NITROSODIMETHYLAMINE	<0.010	PPM			
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM			
N-NITROSODIPHENYLAMINE	<0.010	PPM			
PHENANTHRENE	<0.010	PPM			
PYRENE	<0.010	PPM			
1,2,4-TRICHLOROBENZENE	<0.010	PPM			
2-CHLOROPHENOL	<0.025	PPM			
2,4-DICHLOROPHENOL	<0.025	PPM			
2,4-DIMETHYLPHENOL	<0.025	PPM			
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM			
2,4-DINITROPHENOL	<0.025	PPM			
2-NITROPHENOL	<0.025	PPM			
4-NITROPHENOL	<0.025	PPM			
4-CHLORO-3-METHYLPHENOL	<0.025	PPM			
PENTACHLOROPHENOL	<0.025	PPM			

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ENVIRONMENTAL SERVICES

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111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14101 SOIL/PROJECT # 25400XH/B-8
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
PHENOL	<0.025	PPM			
2,4,6-TRICHLOROPHENOL	<0.025	PPM			
BENZENE	0.056	PPM			
BROMOFORM	<0.001	PPM			
CARBON TETRACHLORIDE	<0.001	PPM			
CHLOROBENZENE	<0.001	PPM			
CHLORODIBROMOMETHANE	<0.001	PPM			
CHLOROETHANE	<0.001	PPM			
2-CHLOROETHYLVINYL ETHER	<0.001	PPM			
CHLOROFORM	<0.001	PPM			
DICHLOROBROMOMETHANE	<0.001	PPM			
DICHLORODIFLUOROMETHANE	<0.001	PPM			
1,1-DICHLOROETHANE	<0.001	PPM			
1,2-DICHLOROETHANE	0.002	PPM			
1,1-DICHLOROETHYLENE	<0.001	PPM			
1,2-DICHLOROPROPANE	<0.001	PPM			
DICHLOROPROPYLENE (MIXED)	<0.001	PPM			
ETHYLBENZENE	<0.002	PPM			
METHYL BROMIDE	<0.001	PPM			
METHYL CHLORIDE	<0.001	PPM			
METHYLENE CHLORIDE	0.006	PPM			
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM			
TETRACHLOROETHYLENE	0.002	PPM			
TOLUENE	0.029	PPM			
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM			
1,1,1-TRICHLOROETHANE	<0.001	PPM			
1,1,2-TRICHLOROETHANE	<0.001	PPM			
TRICHLOROETHYLENE	<0.001	PPM			
TRICHLOROFLUOROMETHANE	<0.001	PPM			
VINYL CHLORIDE	0.004	PPM			
ALDRIN	<2.0	PPB			
ALPHA-BHC	<2.0	PPB			
BETA-BHC	<2.0	PPB			

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ENVIRONMENTAL SERVICES

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14101 SOIL/PROJECT # 25400XH/B-8
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
GAMMA-BHC (LINDANE)	<2.0	PPB			
DELTA-BHC	<2.0	PPB			
	ELEVATED DETECTION LIMIT - DUE TO SAMPLE MATRIX				
CHLORDANE	<0.2	PPB			
4,4'-DDT	<0.2	PPB			
4,4'-DDE	<0.2	PPB			
4,4'-DDD	<0.2	PPB			
DIELDRIN	<0.2	PPB			
ENDOSULFAN I	<0.2	PPB			
ENDOSULFAN II	<0.2	PPB			
ENDOSULFAN SULFATE	<0.2	PPB			
ENDRIN	<0.2	PPB			
ENDRIN ALDEHYDE	<0.2	PPB			
HEPTACHLOR	<2.0	PPB			
HEPTACHLOR EPOXIDE	<2.0	PPB			
TOXAPHENE	<2.0	PPB			
	ELEVATED DETECTION LIMIT - DUE TO SAMPLE MATRIX				
PCB'S - SOLIDS, OIL, WASTE	<1.0	PPM			
PCB'S IN WATER	N/T	PPB			
CALCIUM - TOTAL	24000	PPM			
POTASSIUM - TOTAL	200	PPM			
CHLORIDE	380	PPM			
PH (UNITS)	9.2			2.0-12.5	
	PH DONE ON 10% SOLUTION.				
SULFATE	100	PPM			
TOTAL CYANIDE	<10	PPM			
TOTAL SOLIDS	84	%			
TOTAL KJELDAHL NITROGEN	<50	PPM			
TOTAL PHOSPHORUS	8.6	PPM			

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N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL

CHEM-BIO CORPORATION
140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005

ENVIRONMENTAL SERVICES

S080 8432158 W61

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14103 SOIL/PROJECT # 25400XH/B-9
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CONFIRMATION ?	N/A	PPM				
BARIUM - EP			0.14	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			<0.5	MG/L	5.0	
SILVER - EP			<0.02	MG/L	5.0	
ARSENIC - EP			<0.010	MG/L	5.0	
SELENIUM - EP			<0.020	MG/L	1.0	
MERCURY - EP			0.0009	MG/L	0.2	
ACENAPHTHENE	<0.010	PPM				
ACENAPHTYLENE	<0.010	PPM				
ANTHRACENE	<0.010	PPM				
BENZIDINE	<0.010	PPM				
BENZO (A) ANTHRACENE	<0.010	PPM				
BENZO (A) PYRENE	<0.010	PPM				
BENZO(B)FLUORANTHENE	<0.010	PPM				
BENZO(G,H,I)PERYLENE	<0.010	PPM				
BENZO(K)FLUORANTHENE	<0.010	PPM				
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM				
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM				
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM				
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM				
4-BROMOPHENYL PHENYL ETHER	0.85	PPM				
BUTYL BENZYL PHTHALATE	<0.010	PPM				
2-CHLORONAPHTHALENE	<0.010	PPM				
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM				
CHRYSENE	<0.010	PPM				
DIBENZO(A,H)ANTHRACENE	<0.010	PPM				
1,2-DICHLOROBENZENE	<0.010	PPM				
1,3-DICHLOROBENZENE	<0.010	PPM				
1,4-DICHLOROBENZENE	<0.010	PPM				

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.
TEST METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS, 1982, EPA SW846.
METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT WITH QUESTIONS. REMAINING WASTE SAMPLES WILL BE RETURNED 6 WEEKS FROM THE RECEIVING DATE OF SAMPLE. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT. WI DNR LAB CERTIFICATION #241283020/A.I.H.A. ACCREDITED
N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL

CHEM-BIO CORPORATION
140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005

ENVIRONMENTAL SERVICES

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STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14103 SOIL/PROJECT # 25400XH/B-9
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
3,3'-DICHLOROBENZIDINE	<0.010	PPM			
DIETHYL PHTHALATE	<0.010	PPM			
DIMETHYL PHTHALATE	<0.010	PPM			
DI-N-BUTYL PHTHALATE	<0.010	PPM			
2,4-DINITROTOLUENE	<0.010	PPM			
2,6-DINITROTOLUENE	<0.010	PPM			
DI-N-OCTYL PHTHALATE	<0.010	PPM			
1,2-DIPHENYLHYDRAZINE	<0.010	PPM			
FLUORANTHENE	<0.010	PPM			
FLUORENE	<0.010	PPM			
HEXACHLOROBENZENE	<0.010	PPM			
HEXACHLOROBUTADIANE	<0.010	PPM			
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM			
HEXACHLOROETHANE	<0.010	PPM			
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM			
ISOPHORONE	<0.010	PPM			
NAPHTHALENE	<0.010	PPM			
NITROBENZENE	<0.010	PPM			
N-NITROSODIMETHYLAMINE	<0.010	PPM			
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM			
N-NITROSODIPHENYLAMINE	<0.010	PPM			
PHENANTHRENE	<0.010	PPM			
PYRENE	0.82	PPM			
1,2,4-TRICHLOROBENZENE	<0.010	PPM			
2-CHLOROPHENOL	<0.025	PPM			
2,4-DICHLOROPHENOL	<0.025	PPM			
2,4-DIMETHYLPHENOL	<0.025	PPM			
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM			
2,4-DINITROPHENOL	<0.025	PPM			
2-NITROPHENOL	<0.025	PPM			
4-NITROPHENOL	<0.025	PPM			
4-CHLORO-3-METHYLPHENOL	<0.025	PPM			
PENTACHLOROPHENOL	<0.025	PPM			

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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ENVIRONMENTAL SERVICES

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14103 SOIL/PROJECT # 25400XH/B-9
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
PHENOL	<0.025	PPM			
2,4,6-TRICHLOROPHENOL	<0.025	PPM			
BENZENE	0.006	PPM			
BROMOFORM	<0.001	PPM			
CARBON TETRACHLORIDE	<0.001	PPM			
CHLOROBENZENE	<0.001	PPM			
CHLORODIBROMOMETHANE	<0.001	PPM			
CHLOROETHANE	<0.001	PPM			
2-CHLOROETHYLVINYL ETHER	<0.001	PPM			
CHLOROFORM	<0.001	PPM			
DICHLOROBROMOMETHANE	<0.001	PPM			
DICHLORODIFLUOROMETHANE	<0.001	PPM			
1,1-DICHLOROETHANE	<0.001	PPM			
1,2-DICHLOROETHANE	<0.001	PPM			
1,1-DICHLOROETHYLENE	<0.001	PPM			
1,2-DICHLOROPROPANE	<0.001	PPM			
DICHLOROPROPYLENE (MIXED)	<0.001	PPM			
ETHYLBENZENE	<0.002	PPM			
METHYL BROMIDE	<0.001	PPM			
METHYL CHLORIDE	<0.001	PPM			
METHYLENE CHLORIDE	<0.001	PPM			
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM			
TETRACHLOROETHYLENE	<0.001	PPM			
TOLUENE	0.006	PPM			
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM			
1,1,1-TRICHLOROETHANE	<0.001	PPM			
1,1,2-TRICHLOROETHANE	<0.001	PPM			
TRICHLOROETHYLENE	<0.001	PPM			
TRICHLOROFLUOROMETHANE	<0.001	PPM			
VINYL CHLORIDE	<0.001	PPM			
ALDRIN	<2.0	PPB			
ALPHA-BHC	<2.0	PPB			
BETA-BHC	<2.0	PPB			

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ENVIRONMENTAL SERVICES

03/17/89 LABORATORY REPORT PAGE 1

S080 8432158 W61

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14146 SOIL/PROJECT # 25400XH/B-10
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CONFIRMATION ?	N/A	PPM				
BARIUM - EP			0.16	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			0.5	MG/L	5.0	
SILVER - EP			<0.02	MG/L	5.0	
ARSENIC - EP			<0.010	MG/L	5.0	
SELENIUM - EP			<0.020	MG/L	1.0	
MERCURY - EP			<0.0004	MG/L	0.2	
ACENAPHTHENE	<0.010	PPM				
ACENAPHTYLENE	<0.010	PPM				
ANTHRACENE	<0.010	PPM				
BENZIDINE	<0.010	PPM				
BENZO (A) ANTHRACENE	<0.010	PPM				
BENZO (A) PYRENE	<0.010	PPM				
BENZO(B)FLUORANTHENE	<0.010	PPM				
BENZO(G,H,I)PERYLENE	<0.010	PPM				
BENZO(K)FLUORANTHENE	<0.010	PPM				
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM				
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM				
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM				
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM				
4-BROMOPHENYL PHENYL ETHER	<0.010	PPM				
BUTYL BENZYL PHTHALATE	<0.010	PPM				
2-CHLORONAPHTHALENE	<0.010	PPM				
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM				
CHRYSENE	<0.010	PPM				
DIBENZO(A,H)ANTHRACENE	<0.010	PPM				
1,2-DICHLOROBENZENE	<0.010	PPM				
1,3-DICHLOROBENZENE	<0.010	PPM				
1,4-DICHLOROBENZENE	<0.010	PPM				

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DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
3,3'-DICHLOROBENZIDINE	<0.010	PPM			
DIETHYL PHTHALATE	<0.010	PPM			
DIMETHYL PHTHALATE	<0.010	PPM			
DI-N-BUTYL PHTHALATE	<0.010	PPM			
2,4-DINITROTOLUENE	<0.010	PPM			
2,6-DINITROTOLUENE	<0.010	PPM			
DI-N-OCTYL PHTHALATE	<0.010	PPM			
1,2-DIPHENYLHYDRAZINE	<0.010	PPM			
FLUORANTHENE	<0.010	PPM			
FLUORENE	<0.010	PPM			
HEXACHLOROBENZENE	<0.010	PPM			
HEXACHLOROBUTADIANE	<0.010	PPM			
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM			
HEXACHLOROETHANE	<0.010	PPM			
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM			
ISOPHORONE	<0.010	PPM			
NAPHTHALENE	<0.010	PPM			
NITROBENZENE	<0.010	PPM			
N-NITROSODIMETHYLAMINE	<0.010	PPM			
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM			
N-NITROSODIPHENYLAMINE	<0.010	PPM			
PHENANTHRENE	<0.010	PPM			
PYRENE	<0.010	PPM			
1,2,4-TRICHLOROBENZENE	<0.010	PPM			
2-CHLOROPHENOL	<0.025	PPM			
2,4-DICHLOROPHENOL	<0.025	PPM			
2,4-DIMETHYLPHENOL	<0.025	PPM			
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM			
2,4-DINITROPHENOL	<0.025	PPM			
2-NITROPHENOL	<0.025	PPM			
4-NITROPHENOL	<0.025	PPM			
4-CHLORO-3-METHYLPHENOL	<0.025	PPM			
PENTACHLOROPHENOL	<0.025	PPM			

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N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL MTR

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ENVIRONMENTAL SERVICES

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111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14146 SOIL/PROJECT # 25400XH/B-10
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
PHENOL	<0.025	PPM			
2,4,6-TRICHLOROPHENOL	<0.025	PPM			
BENZENE	<0.002	PPM			
BROMOFORM	<0.001	PPM			
CARBON TETRACHLORIDE	<0.001	PPM			
CHLOROBENZENE	<0.001	PPM			
CHLORODIBROMOMETHANE	<0.001	PPM			
CHLOROETHANE	<0.001	PPM			
2-CHLOROETHYLVINYL ETHER	<0.001	PPM			
CHLOROFORM	<0.001	PPM			
DICHLOROBROMOMETHANE	<0.001	PPM			
DICHLORODIFLUOROMETHANE	<0.001	PPM			
1,1-DICHLOROETHANE	<0.001	PPM			
1,2-DICHLOROETHANE	<0.001	PPM			
1,1-DICHLOROETHYLENE	<0.001	PPM			
1,2-DICHLOROPROPANE	<0.001	PPM			
DICHLOROPROPYLENE (MIXED)	<0.001	PPM			
ETHYLBENZENE	<0.002	PPM			
METHYL BROMIDE	<0.001	PPM			
METHYL CHLORIDE	<0.001	PPM			
METHYLENE CHLORIDE	0.004	PPM			
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM			
TETRACHLOROETHYLENE	0.001	PPM			
TOLUENE	0.036	PPM			
1,2-TRANSDICHLOROETHYLENE	0.23	PPM			
1,1,1-TRICHLOROETHANE	<0.001	PPM			
1,1,2-TRICHLOROETHANE	<0.001	PPM			
TRICHLOROETHYLENE	<0.001	PPM			
TRICHLOROFLUOROMETHANE	<0.001	PPM			
VINYL CHLORIDE	<0.001	PPM			
ALDRIN	<2.0	PPB			
	HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE				
ALPHA-BHC	<2.0	PPB			

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14146 SOIL/PROJECT # 25400XH/B-10
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
BETA-BHC	<2.0	PPB			
GAMMA-BHC (LINDANE)	<2.0	PPB			
DELTA-BHC	<2.0	PPB			
CHLORDANE	<2.0	PPB			
4,4'-DDT	<0.2	PPB			
4,4'-DDE	<0.2	PPB			
4,4'-DDD	<0.2	PPB			
DIELDRIN	<0.2	PPB			
ENDOSULFAN I	<2.0	PPB			
ENDOSULFAN II	<0.2	PPB			
ENDOSULFAN SULFATE	<0.2	PPB			
ENDRIN	<0.2	PPB			
ENDRIN ALDEHYDE	<0.2	PPB			
HEPTACHLOR	<2.0	PPB			
	HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE				
HEPTACHLOR EPOXIDE	<2.0	PPB			
TOXAPHENE	<2.0	PPB			
PCB'S - SOLIDS, OIL, WASTE	<1.0	PPM			
	HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE				
PCB'S IN WATER	N/T	PPB			
CALCIUM - TOTAL	99000	PPM			
POTASSIUM - TOTAL	320	PPM			
CHLORIDE	110	PPM			
PH (UNITS)	8.8			2.0-12.5	
	PH DONE ON 10% SOLUTION.				
SULFATE	190	PPM			
TOTAL CYANIDE	<10	PPM			
TOTAL SOLIDS	93	%			
TOTAL KJELDAHL NITROGEN	<50	PPM			
TOTAL PHOSPHORUS	11	PPM			

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STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14107 SOIL/PROJECT # 25400XH/S-1
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CONFIRMATION ?	NO	PPM				
	DO NOT CONFIRM PER DAVE GRUMMAN 3/14/89 - JS					
BARIUM - EP			0.34	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			<0.5	MG/L	5.0	
SILVER - EP			<0.02	MG/L	5.0	
ARSENIC - EP			<0.010	MG/L	5.0	
SELENIUM - EP			<0.020	MG/L	1.0	
MERCURY - EP			<0.0004	MG/L	0.2	
ACENAPHTHENE	<0.010	PPM				
ACENAPHTYLENE	<0.010	PPM				
ANTHRACENE	4.9	PPM				
BENZIDINE	<0.010	PPM				
BENZO (A) ANTHRACENE	3.1	PPM				
BENZO (A) PYRENE	<0.010	PPM				
BENZO(B)FLUORANTHENE	0.67	PPM				
BENZO(G,H,I)PERYLENE	<0.010	PPM				
BENZO(K)FLUORANTHENE	<0.010	PPM				
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM				
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM				
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM				
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM				
4-BROMOPHENYL PHENYL ETHER	<0.010	PPM				
BUTYL BENZYL PHTHALATE	<0.010	PPM				
2-CHLORONAPHTHALENE	<0.010	PPM				
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM				
CHRYSENE	2.8	PPM				
DIBENZO(A,H)ANTHRACENE	<0.010	PPM				
1,2-DICHLOROBENZENE	<0.010	PPM				
1,3-DICHLOROBENZENE	<0.010	PPM				

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STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14107 SOIL/PROJECT # 25400XH/S-1
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
1,4-DICHLOROBENZENE	<0.010	PPM			
3,3'-DICHLOROBENZIDINE	<0.010	PPM			
DIETHYL PHTHALATE	<0.010	PPM			
DIMETHYL PHTHALATE	<0.010	PPM			
DI-N-BUTYL PHTHALATE	0.20	PPM			
2,4-DINITROTOLUENE	<0.010	PPM			
2,6-DINITROTOLUENE	<0.010	PPM			
DI-N-OCTYL PHTHALATE	<0.010	PPM			
1,2-DIPHENYLHYDRAZINE	<0.010	PPM			
FLUORANTHENE	<0.010	PPM			
FLUORENE	3.5	PPM			
HEXACHLOROBENZENE	<0.010	PPM			
HEXACHLOROBUTADIANE	<0.010	PPM			
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM			
HEXACHLOROETHANE	<0.010	PPM			
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM			
ISOPHORONE	<0.010	PPM			
NAPHTHALENE	<0.010	PPM			
NITROBENZENE	<0.010	PPM			
N-NITROSODIMETHYLAMINE	<0.010	PPM			
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM			
N-NITROSODIPHENYLAMINE	<0.010	PPM			
PHENANTHRENE	<0.010	PPM			
PYRENE	4.0	PPM			
1,2,4-TRICHLOROBENZENE	<0.010	PPM			
2-CHLOROPHENOL	<0.025	PPM			
2,4-DICHLOROPHENOL	<0.025	PPM			
2,4-DIMETHYLPHENOL	<0.025	PPM			
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM			
2,4-DINITROPHENOL	<0.025	PPM			
2-NITROPHENOL	<0.025	PPM			
4-NITROPHENOL	<0.025	PPM			
4-CHLORO-3-METHYLPHENOL	<0.025	PPM			

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL M.T.R.

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111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14107 SOIL/PROJECT # 25400XH/S-1
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
PENTACHLOROPHENOL	<0.025	PPM			
PHENOL	<0.025	PPM			
2,4,6-TRICHLOROPHENOL	<0.025	PPM			
BENZENE	0.16	PPM			
BROMOFORM	<0.001	PPM			
CARBON TETRACHLORIDE	<0.001	PPM			
CHLOROBENZENE	<0.001	PPM			
CHLORODIBROMOMETHANE	<0.001	PPM			
CHLOROETHANE	0.004	PPM			
2-CHLOROETHYLVINYL ETHER	<0.001	PPM			
CHLOROFORM	0.007	PPM			
DICHLOROBROMOMETHANE	<0.001	PPM			
DICHLORODIFLUOROMETHANE	<0.001	PPM			
1,1-DICHLOROETHANE	<0.001	PPM			
1,2-DICHLOROETHANE	0.004	PPM			
1,1-DICHLOROETHYLENE	<0.001	PPM			
1,2-DICHLOROPROPANE	<0.001	PPM			
DICHLOROPROPYLENE (MIXED)	<0.001	PPM			
ETHYLBENZENE	0.014	PPM			
METHYL BROMIDE	0.002	PPM			
METHYL CHLORIDE	<0.001	PPM			
METHYLENE CHLORIDE	0.092	PPM			
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM			
TETRACHLOROETHYLENE	0.003	PPM			
TOLUENE	0.042	PPM			
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM			
1,1,1-TRICHLOROETHANE	0.001	PPM			
1,1,2-TRICHLOROETHANE	<0.001	PPM			
TRICHLOROETHYLENE	0.001	PPM			
TRICHLOROFLUOROMETHANE	<0.001	PPM			
VINYL CHLORIDE	<0.001	PPM			
ALDRIN	<2.0	PPB			

HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14107 SOIL/PROJECT # 25400XH/S-1
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
ALPHA-BHC	<2.0	PPB			
BETA-BHC	<2.0	PPB			
GAMMA-BHC (LINDANE)	<2.0	PPB			
DELTA-BHC	<2.0	PPB			
CHLORDANE	<2.0	PPB			
4,4'-DDT	<2.0	PPB			
4,4'-DDE	<2.0	PPB			
4,4'-DDD	<2.0	PPB			
DIELDRIN	<2.0	PPB			
	HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE				
ENDOSULFAN I	<2.0	PPB			
ENDOSULFAN II	<2.0	PPB			
ENDOSULFAN SULFATE	<2.0	PPB			
ENDRIN	<2.0	PPB			
ENDRIN ALDEHYDE	<2.0	PPB			
HEPTACHLOR	<2.0	PPB			
HEPTACHLOR EPOXIDE	<2.0	PPB			
TOXAPHENE	<2.0	PPB			
PCB'S - SOLIDS, OIL, WASTE	<2.0	PPM			
	HIGH DETECTION LIMITS DUE TO MATRIX INTERFERENCE				
PCB'S IN WATER	N/T	PPB			
CALCIUM - TOTAL	44000	PPM			
POTASSIUM - TOTAL	350	PPM			
CHLORIDE	180	PPM			
PH (UNITS)	8.8			2.0-12.5	
	PH DONE ON 10% SOLUTION.				
SULFATE	220	PPM			
TOTAL CYANIDE	<10	PPM			
TOTAL SOLIDS	91	%			
TOTAL KJELDAHL NITROGEN	290	PPM			
TOTAL PHOSPHORUS	67	PPM			

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.
TEST METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS, 1982, EPA SW846.
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03/17/89 LABORATORY REPORT

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SAMPLE 89052-S14102 SOIL/PROJECT # 25400XH/S-2
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CONFIRMATION ?	YES PER D. GRUMMAN 3/6	PPM				
BARIUM - EP			0.26	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			<0.5	MG/L	5.0	
SILVER - EP			<0.02	MG/L	5.0	
ARSENIC - EP			<0.010	MG/L	5.0	
SELENIUM - EP			<0.020	MG/L	1.0	
MERCURY - EP			0.0011	MG/L	0.2	
ACENAPHTHENE	0.51	PPM				
ACENAPHTYLENE	<0.010	PPM				
ANTHRACENE	<0.010	PPM				
BENZIDINE	<0.010	PPM				
BENZO (A) ANTHRACENE	6.0	PPM				
BENZO (A) PYRENE	6.0	PPM				
BENZO(B)FLUORANTHENE	<0.010	PPM				
BENZO(G,H,I)PERYLENE	<0.010	PPM				
BENZO(K)FLUORANTHENE	<0.010	PPM				
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM				
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM				
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM				
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM				
4-BROMOPHENYL PHENYL ETHER	<0.010	PPM				
BUTYL BENZYL PHTHALATE	<0.010	PPM				
2-CHLORONAPHTHALENE	<0.010	PPM				
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM				
CHRYSENE	6.0	PPM				
DIBENZO(A,H)ANTHRACENE	3.6	PPM				
1,2-DICHLOROBENZENE	<0.010	PPM				
1,3-DICHLOROBENZENE	<0.010	PPM				

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.
TEST METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS, 1982, EPA SW846.
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ATTN: DAVE GRUMMAN

SAMPLE 89052-S14102 SOIL/PROJECT # 25400XH/S-2
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
1,4-DICHLOROBENZENE	<0.010	PPM			
3,3'-DICHLOROBENZIDINE	<0.010	PPM			
DIETHYL PHTHALATE	<0.010	PPM			
DIMETHYL PHTHALATE	<0.010	PPM			
DI-N-BUTYL PHTHALATE	<0.010	PPM			
2,4-DINITROTOLUENE	<0.010	PPM			
2,6-DINITROTOLUENE	<0.010	PPM			
DI-N-OCTYL PHTHALATE	<0.010	PPM			
1,2-DIPHENYLHYDRAZINE	<0.010	PPM			
FLUORANTHENE	9.9	PPM			
FLUORENE	<0.010	PPM			
HEXACHLOROBENZENE	<0.010	PPM			
HEXACHLOROBUTADIANE	<0.010	PPM			
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM			
HEXACHLOROETHANE	<0.010	PPM			
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM			
ISOPHORONE	<0.010	PPM			
NAPHTHALENE	<0.010	PPM			
NITROBENZENE	<0.010	PPM			
N-NITROSODIMETHYLAMINE	<0.010	PPM			
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM			
N-NITROSODIPHENYLAMINE	<0.010	PPM			
PHENANTHRENE	12	PPM			
PYRENE	10	PPM			
1,2,4-TRICHLOROBENZENE	<0.010	PPM			
2-CHLOROPHENOL	<0.025	PPM			
2,4-DICHLOROPHENOL	<0.025	PPM			
2,4-DIMETHYLPHENOL	<0.025	PPM			
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM			
2,4-DINITROPHENOL	<0.025	PPM			
2-NITROPHENOL	<0.025	PPM			
4-NITROPHENOL	<0.025	PPM			
4-CHLORO-3-METHYLPHENOL	<0.025	PPM			

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ATTN: DAVE GRUMMAN

SAMPLE 89052-S14102 SOIL/PROJECT # 25400XH/S-2
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
PENTACHLOROPHENOL	<0.025	PPM			
PHENOL	<0.025	PPM			
2,4,6-TRICHLOROPHENOL	<0.025	PPM			
BENZENE	0.29	PPM			
BROMOFORM	<0.001	PPM			
CARBON TETRACHLORIDE	<0.001	PPM			
CHLOROBENZENE	<0.001	PPM			
CHLORODIBROMOMETHANE	<0.001	PPM			
CHLOROETHANE	<0.001	PPM			
2-CHLOROETHYLVINYL ETHER	<0.001	PPM			
CHLOROFORM	0.013	PPM			
DICHLOROBROMOMETHANE	<0.001	PPM			
DICHLORODIFLUOROMETHANE	<0.001	PPM			
1,1-DICHLOROETHANE	<0.001	PPM			
1,2-DICHLOROETHANE	0.008	PPM			
1,1-DICHLOROETHYLENE	<0.001	PPM			
1,2-DICHLOROPROPANE	<0.001	PPM			
DICHLOROPROPYLENE (MIXED)	<0.001	PPM			
ETHYLBENZENE	0.032	PPM			
METHYL BROMIDE	<0.001	PPM			
METHYL CHLORIDE	<0.001	PPM			
METHYLENE CHLORIDE	0.11	PPM			
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM			
TETRACHLOROETHYLENE	0.30	PPM			
TOLUENE	0.053	PPM			
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM			
1,1,1-TRICHLOROETHANE	0.002	PPM			
1,1,2-TRICHLOROETHANE	<0.001	PPM			
TRICHLOROETHYLENE	0.14	PPM			
TRICHLOROFLUOROMETHANE	<0.001	PPM			
VINYL CHLORIDE	<0.001	PPM			
ALDRIN	<20	PPB			
ALPHA-BHC	<20	PPB			

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S14102 SOIL/PROJECT # 25400XH/S-2
DATE COLLECTED 02/16/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	EP TOXICITY	EP LIMIT	HAZ.CODE
BETA-BHC	<20	PPB			
GAMMA-BHC (LINDANE)	<20	PPB			
DELTA-BHC	<20	PPB			
CHLORDANE	<20	PPB			
4,4'-DDT	<20	PPB			
4,4'-DDE	<20	PPB			
4,4'-DDD	<20	PPB			
	ELEVATED DETECTION LIMIT - DUE TO SAMPLE MATRIX				
DIELDRIN	<20	PPB			
ENDOSULFAN I	<20	PPB			
ENDOSULFAN II	<20	PPB			
ENDOSULFAN SULFATE	<20	PPB			
ENDRIN	<20	PPB			
ENDRIN ALDEHYDE	<20	PPB			
HEPTACHLOR	<20	PPB			
HEPTACHLOR EPOXIDE	<20	PPB			
TOXAPHENE	<20	PPB			
	ELEVATED DETECTION LIMIT - DUE TO SAMPLE MATRIX				
PCB'S - SOLIDS, OIL, WASTE	<10	PPM			
	ELEVATED DETECTION LIMIT - DUE TO SAMPLE MATRIX				
PCB'S IN WATER	N/T	PPB			
CALCIUM - TOTAL	24000	PPM			
POTASSIUM - TOTAL	820	PPM			
CHLORIDE	150	PPM			
PH (UNITS)	8.9			2.0-12.5	
	PH DONE ON 10% SOLUTION.				
SULFATE	1000	PPM			
TOTAL CYANIDE	<10	PPM			
TOTAL SOLIDS	82	%			
TOTAL KJELDAHL NITROGEN	230	PPM			
TOTAL PHOSPHORUS	79	PPM			

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ATTN: DAVE GRUMMAN

SAMPLE 89072-S13061 SOIL/PROJECT # 25400XH/R-1
DATE COLLECTED 03/10/89 DATE RECEIVED 03/13/89

TEST NAME	RESULT	UNITS
CONFIRMATION ?	N/A	PPM
PCB'S - SOLIDS, OIL, WASTE	<1.0	PPM
ACENAPHTHENE	<0.010	PPM
ACENAPHTYLENE	<0.010	PPM
ANTHRACENE	<0.010	PPM
BENZIDINE	<0.010	PPM
BENZO (A) ANTHRACENE	<0.010	PPM
BENZO (A) PYRENE	<0.010	PPM
BENZO(B)FLUORANTHENE	<0.010	PPM
BENZO(G,H,I)PERYLENE	<0.010	PPM
BENZO(K)FLUORANTHENE	<0.010	PPM
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM
4-BROMOPHENYL PHENYL ETHER	<0.010	PPM
BUTYL BENZYL PHTHALATE	<0.010	PPM
2-CHLORONAPHTHALENE	<0.010	PPM
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM
CHRYSENE	<0.010	PPM
DIBENZO(A,H)ANTHRACENE	<0.010	PPM
1,2-DICHLOROBENZENE	<0.010	PPM
1,3-DICHLOROBENZENE	<0.010	PPM
1,4-DICHLOROBENZENE	<0.010	PPM
3,3'-DICHLOROBENZIDINE	<0.010	PPM
DIETHYL PHTHALATE	<0.010	PPM
DIMETHYL PHTHALATE	<0.010	PPM
DI-N-BUTYL PHTHALATE	<0.010	PPM
2,4-DINITROTOLUENE	<0.010	PPM
2,6-DINITROTOLUENE	<0.010	PPM
DI-N-OCTYL PHTHALATE	<0.010	PPM
1,2-DIPHENYLHYDRAZINE	<0.010	PPM
FLUORANTHENE	<0.010	PPM

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89072-S13061 SOIL/PROJECT # 25400XH/R-1
DATE COLLECTED 03/10/89 DATE RECEIVED 03/13/89

TEST NAME	RESULT	UNITS
FLUORENE	<0.010	PPM
HEXACHLOROBENZENE	<0.010	PPM
HEXACHLOROBUTADIANE	<0.010	PPM
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM
HEXACHLOROETHANE	<0.010	PPM
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM
ISOPHORONE	<0.010	PPM
NAPHTHALENE	<0.010	PPM
NITROBENZENE	<0.010	PPM
N-NITROSODIMETHYLAMINE	<0.010	PPM
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM
N-NITROSODIPHENYLAMINE	<0.010	PPM
PHENANTHRENE	<0.010	PPM
PYRENE	<0.010	PPM
1,2,4-TRICHLOROBENZENE	<0.010	PPM
2-CHLOROPHENOL	<0.025	PPM
2,4-DICHLOROPHENOL	<0.025	PPM
2,4-DIMETHYLPHENOL	<0.025	PPM
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM
2,4-DINITROPHENOL	<0.025	PPM
2-NITROPHENOL	<0.025	PPM
4-NITROPHENOL	<0.025	PPM
4-CHLORO-3-METHYLPHENOL	<0.025	PPM
PENTACHLOROPHENOL	<0.025	PPM
PHENOL	<0.025	PPM
2,4,6-TRICHLOROPHENOL	<0.025	PPM
BENZENE	0.017	PPM
BROMOFORM	<0.001	PPM
CARBON TETRACHLORIDE	<0.001	PPM
CHLOROBENZENE	<0.001	PPM
CHLORODIBROMOMETHANE	<0.001	PPM
CHLOROETHANE	<0.001	PPM
2-CHLOROETHYLVINYL ETHER	<0.001	PPM

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT WITH QUESTIONS. REMAINING WASTE SAMPLES WILL BE RETURNED 6 WEEKS FROM THE RECEIVING DATE OF SAMPLE. WATER SAMPLES ARE DISPOSED OF 30 DAYS AFTER RECEIPT. WI DNR LAB CERTIFICATION #241283020/A.I.H.A. ACCREDITED.
N/T = NOT TESTED N/A = NOT APPLICABLE APPROVAL

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S080 8432872 W61

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89072-S13061 SOIL/PROJECT # 25400XH/R-1
DATE COLLECTED 03/10/89 DATE RECEIVED 03/13/89

TEST NAME	RESULT	UNITS
CHLOROFORM	<0.001	PPM
DICHLOROBROMOMETHANE	<0.001	PPM
DICHLORODIFLUOROMETHANE	<0.001	PPM
1,1-DICHLOROETHANE	0.039	PPM
1,2-DICHLOROETHANE	<0.001	PPM
1,1-DICHLOROETHYLENE	<0.001	PPM
1,2-DICHLOROPROPANE	<0.001	PPM
DICHLOROPROPYLENE (MIXED)	<0.001	PPM
ETHYLBENZENE	<0.002	PPM
METHYL BROMIDE	<0.001	PPM
METHYL CHLORIDE	<0.001	PPM
METHYLENE CHLORIDE	0.11	PPM
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM
TETRACHLOROETHYLENE	<0.001	PPM
TOLUENE	0.021	PPM
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM
1,1,1-TRICHLOROETHANE	0.027	PPM
1,1,2-TRICHLOROETHANE	<0.001	PPM
TRICHLOROETHYLENE	<0.001	PPM
TRICHLOROFLUOROMETHANE	<0.001	PPM
VINYL CHLORIDE	<0.001	PPM

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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ENVIRONMENTAL SERVICES

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S080 8432872 W61

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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89072-S13062 SOIL/PROJECT # 25400XH/R-2
DATE COLLECTED 03/10/89 DATE RECEIVED 03/13/89

TEST NAME	RESULT	UNITS	
CONFIRMATION ?	N/A	PPM	!
PCB'S - SOLIDS, OIL, WASTE	<1.0	PPM	!
ACENAPHTHENE	<0.010	PPM	!
ACENAPHTYLENE	<0.010	PPM	!
ANTHRACENE	<0.010	PPM	!
BENZIDINE	<0.010	PPM	!
BENZO (A) ANTHRACENE	<0.010	PPM	!
BENZO (A) PYRENE	<0.010	PPM	!
BENZO(B)FLUORANTHENE	<0.010	PPM	!
BENZO(G,H,I)PERYLENE	<0.010	PPM	!
BENZO(K)FLUORANTHENE	<0.010	PPM	!
BIS (2-CHLOROETHOXY) METHA	<0.010	PPM	!
BIS (2-CHLOROETHYL) ETHER	<0.010	PPM	!
BIS (2-CHLOROISOPROPYL) ET	<0.010	PPM	!
BIS (2-ETHYLHEXYL) PHTHALA	<0.010	PPM	!
4-BROMOPHENYL PHENYL ETHER	<0.010	PPM	!
BUTYL BENZYL PHTHALATE	<0.010	PPM	!
2-CHLORONAPHTHALENE	<0.010	PPM	!
4-CHLOROPHENYL PHENYL ETHE	<0.010	PPM	!
CHRYSENE	<0.010	PPM	!
DIBENZO(A,H)ANTHRACENE	<0.010	PPM	!
1,2-DICHLOROBENZENE	<0.010	PPM	!
1,3-DICHLOROBENZENE	<0.010	PPM	!
1,4-DICHLOROBENZENE	<0.010	PPM	!
3,3'-DICHLOROBENZIDINE	<0.010	PPM	!
DIETHYL PHTHALATE	<0.010	PPM	!
DIMETHYL PHTHALATE	<0.010	PPM	!
DI-N-BUTYL PHTHALATE	<0.010	PPM	!
2,4-DINITROTOLUENE	<0.010	PPM	!
2,6-DINITROTOLUENE	<0.010	PPM	!
DI-N-OCTYL PHTHALATE	<0.010	PPM	!
1,2-DIPHENYLHYDRAZINE	<0.010	PPM	!
FLUORANTHENE	<0.010	PPM	!

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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ENVIRONMENTAL SERVICES

S080 8432872 W61

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89072-S13062 SOIL/PROJECT # 25400XH/R-2
DATE COLLECTED 03/10/89 DATE RECEIVED 03/13/89

TEST NAME	RESULT	UNITS	
FLUORENE	<0.010	PPM	!
HEXACHLOROBENZENE	<0.010	PPM	!
HEXACHLOROBUTADIANE	<0.010	PPM	!
HEXACHLOROCYCLOPENTADIENE	<0.010	PPM	!
HEXACHLOROETHANE	<0.010	PPM	!
INDENO(1,2,3,C,D)PYRENE	<0.010	PPM	!
ISOPHORONE	<0.010	PPM	!
NAPHTHALENE	<0.010	PPM	!
NITROBENZENE	<0.010	PPM	!
N-NITROSODIMETHYLAMINE	<0.010	PPM	!
N-NITROSO-DI-N-PROPYLAMINE	<0.010	PPM	!
N-NITROSODIPHENYLAMINE	<0.010	PPM	!
PHENANTHRENE	<0.010	PPM	!
PYRENE	<0.010	PPM	!
1,2,4-TRICHLOROBENZENE	<0.010	PPM	!
2-CHLOROPHENOL	<0.025	PPM	!
2,4-DICHLOROPHENOL	<0.025	PPM	!
2,4-DIMETHYLPHENOL	<0.025	PPM	!
4,6-DINITRO-2-METHYLPHENOL	<0.025	PPM	!
2,4-DINITROPHENOL	<0.025	PPM	!
2-NITROPHENOL	<0.025	PPM	!
4-NITROPHENOL	<0.025	PPM	!
4-CHLORO-3-METHYLPHENOL	<0.025	PPM	!
PENTACHLOROPHENOL	<0.025	PPM	!
PHENOL	<0.025	PPM	!
2,4,6-TRICHLOROPHENOL	<0.025	PPM	!
BENZENE	0.024	PPM	!
BROMOFORM	<0.001	PPM	!
CARBON TETRACHLORIDE	<0.001	PPM	!
CHLOROBENZENE	<0.001	PPM	!
CHLORODIBROMOMETHANE	<0.001	PPM	!
CHLOROETHANE	<0.001	PPM	!
2-CHLOROETHYLVINYL ETHER	<0.001	PPM	!

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89072-S13062 SOIL/PROJECT # 25400XH/R-2
DATE COLLECTED 03/10/89 DATE RECEIVED 03/13/89

TEST NAME	RESULT	UNITS	
CHLOROFORM	<0.001	PPM	!
DICHLOROBROMOMETHANE	<0.001	PPM	!
DICHLORODIFLUOROMETHANE	<0.001	PPM	!
1,1-DICHLOROETHANE	<0.001	PPM	!
1,2-DICHLOROETHANE	<0.001	PPM	!
1,1-DICHLOROETHYLENE	<0.001	PPM	!
1,2-DICHLOROPROPANE	<0.001	PPM	!
DICHLOROPROPYLENE (MIXED)	<0.001	PPM	!
ETHYLBENZENE	<0.002	PPM	!
METHYL BROMIDE	<0.001	PPM	!
METHYL CHLORIDE	<0.001	PPM	!
METHYLENE CHLORIDE	0.019	PPM	!
1,1,2,2-TETRACHLOROETHANE	<0.001	PPM	!
TETRACHLOROETHYLENE	<0.001	PPM	!
TOLUENE	0.024	PPM	!
1,2-TRANSDICHLOROETHYLENE	<0.001	PPM	!
1,1,1-TRICHLOROETHANE	0.004	PPM	!
1,1,2-TRICHLOROETHANE	<0.001	PPM	!
TRICHLOROETHYLENE	<0.001	PPM	!
TRICHLOROFLUOROMETHANE	<0.001	PPM	!
VINYL CHLORIDE	<0.001	PPM	!

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ENVIRONMENTAL SERVICES

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STS CONSULTANTS LTD.-CHGO
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NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S13061 WATER/PROJECT # 25400XH/MW #1
DATE COLLECTED 02/20/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	
CONFIRMATION ?	N/A	PPB	!
BARIUM - SOLUBLE	190	PPB	!
CADMIUM - SOLUBLE	<10	PPB	!
CHROMIUM - SOLUBLE	<10	PPB	!
LEAD - SOLUBLE	<100	PPB	!
SILVER - SOLUBLE	<10	PPB	!
ARSENIC - SOLUBLE	<10	PPB	!
SELENIUM - SOLUBLE	<20	PPB	!
MERCURY - SOLUBLE	0.6	PPB	!
ACENAPHTHENE	<10	PPB	!
ACENAPHTYLENE	<10	PPB	!
ANTHRACENE	<10	PPB	!
BENZIDINE	<10	PPB	!
BENZO (A) ANTHRACENE	<10	PPB	!
BENZO (A) PYRENE	<10	PPB	!
BENZO(B)FLUORANTHENE	<10	PPB	!
BENZO(G,H,I)PERYLENE	<10	PPB	!
BENZO(K)FLUORANTHENE	<10	PPB	!
BIS (2-CHLOROETHOXY) METHA	<10	PPB	!
BIS (2-CHLOROETHYL) ETHER	<10	PPB	!
BIS (2-CHLOROISOPROPYL) ET	<10	PPB	!
BIS (2-ETHYLHEXYL) PHTHALA	<10	PPB	!
4-BROMOPHENYL PHENYL ETHER	<10	PPB	!
BUTYL BENZYL PHTHALATE	<10	PPB	!
2-CHLORONAPHTHALENE	<10	PPB	!
4-CHLOROPHENYL PHENYL ETHE	<10	PPB	!
CHRYSENE	<10	PPB	!
DIBENZO(A,H)ANTHRACENE	<10	PPB	!
1,2-DICHLOROBENZENE	<10	PPB	!
1,3-DICHLOROBENZENE	<10	PPB	!
1,4-DICHLOROBENZENE	<10	PPB	!

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.
TEST METHODS FOR EVALUATING SOLID WASTE, PHYSICAL/CHEMICAL METHODS, 1982, EPA SW846.
METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S13061 WATER/PROJECT # 25400XH/MW #1
DATE COLLECTED 02/20/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	
3,3'-DICHLOROBENZIDINE	<10	PPB	!
DIETHYL PHTHALATE	<10	PPB	!
DIMETHYL PHTHALATE	<10	PPB	!
DI-N-BUTYL PHTHALATE	<10	PPB	!
2,4-DINITROTOLUENE	<10	PPB	!
2,6-DINITROTOLUENE	<10	PPB	!
DI-N-OCTYL PHTHALATE	<10	PPB	!
1,2-DIPHENYLHYDRAZINE	<10	PPB	!
FLUORANTHENE	<10	PPB	!
FLUORENE	<10	PPB	!
HEXACHLOROBENZENE	<10	PPB	!
HEXACHLOROBUTADIANE	<10	PPB	!
HEXACHLOROCYCLOPENTADIENE	<10	PPB	!
HEXACHLOROETHANE	<10	PPB	!
INDENO(1,2,3,C,D)PYRENE	<10	PPB	!
ISOPHORONE	<10	PPB	!
NAPHTHALENE	<10	PPB	!
NITROBENZENE	<10	PPB	!
N-NITROSODIMETHYLAMINE	<10	PPB	!
N-NITROSO-DI-N-PROPYLAMINE	<10	PPB	!
N-NITROSODIPHENYLAMINE	<10	PPB	!
PHENANTHRENE	<10	PPB	!
PYRENE	<10	PPB	!
1,2,4-TRICHLOROBENZENE	<10	PPB	!
2-CHLOROPHENOL	<25	PPB	!
2,4-DICHLOROPHENOL	<25	PPB	!
2,4-DIMETHYLPHENOL	<25	PPB	!
4,6-DINITRO-2-METHYLPHENOL	<25	PPB	!
2,4-DINITROPHENOL	<25	PPB	!
2-NITROPHENOL	<25	PPB	!
4-NITROPHENOL	<25	PPB	!
4-CHLORO-3-METHYLPHENOL	<25	PPB	!
PENTACHLOROPHENOL	<25	PPB	!

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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ENVIRONMENTAL SERVICES

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111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S13061 WATER/PROJECT # 25400XH/MW #1
DATE COLLECTED 02/20/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	
PHENOL	<25	PPB	!
2,4,6-TRICHLOROPHENOL	<25	PPB	!
DICHLOROBROMOMETHANE	<1.0	PPB	!
DICHLORODIFLUOROMETHANE	<1.0	PPB	!
1,1-DICHLOROETHANE	<1.0	PPB	!
1,2-DICHLOROETHANE	<1.0	PPB	!
1,1-DICHLOROETHYLENE	<1.0	PPB	!
1,2-DICHLOROPROPANE	<1.0	PPB	!
DICHLOROPROPYLENE (MIXED)	<1.0	PPB	!
ETHYLBENZENE	<1.0	PPB	!
METHYL BROMIDE	<1.0	PPB	!
METHYL CHLORIDE	<1.0	PPB	!
METHYLENE CHLORIDE	7.0	PPB	!
1,1,2,2-TETRACHLOROETHANE	<1.0	PPB	!
TETRACHLOROETHYLENE	<1.0	PPB	!
TOLUENE	<1.0	PPB	!
1,2-TRANSDICHLOROETHYLENE	<1.0	PPB	!
1,1,1-TRICHLOROETHANE	<1.0	PPB	!
1,1,2-TRICHLOROETHANE	<1.0	PPB	!
TRICHLOROETHYLENE	<1.0	PPB	!
TRICHLOROFLUOROMETHANE	<1.0	PPB	!
VINYL CHLORIDE	<1.0	PPB	!
ALDRIN	<0.2	PPB	!
ALPHA--BHC	<0.2	PPB	!
BETA-BHC	<0.2	PPB	!
GAMMA--BHC (LINDANE)	<0.2	PPB	!
DELTA--BHC	<0.2	PPB	!
CHLORDANE	<0.2	PPB	!
4,4'-DDT	<0.2	PPB	!
4,4'-DDE	<0.2	PPB	!
4,4'-DDD	<0.2	PPB	!
DIELDRIN	<0.2	PPB	!
ENDOSULFAN I	<0.2	PPB	!

METHODS 601-612, FEDERAL REGISTER, VOL. 44, NO. 233.
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ENVIRONMENTAL SERVICES

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STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S13061 WATER/PROJECT # 25400XH/MW #1
DATE COLLECTED 02/20/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	
ENDOSULFAN II	<0.2	PPB	!
ENDOSULFAN SULFATE	<0.2	PPB	!
ENDRIN	<0.2	PPB	!
ENDRIN ALDEHYDE	<0.2	PPB	!
HEPTACHLOR	<0.2	PPB	!
HEPTACHLOR EPOXIDE	<0.2	PPB	!
TOXAPHENE	<0.2	PPB	!
PCB'S - SOLIDS, OIL, WASTE	N/T	PPM	!
PCB'S IN WATER	<0.5	PPB	!
CALCIUM - TOTAL	460000	PPB	!
POTASSIUM - TOTAL	22000	PPB	!
CHLORIDE	<10000	PPB	!
PH (UNITS)	7.8		!
	PH DONE ON 10% SOLUTION.		
SULFATE	2900	PPB	!
TOTAL CYANIDE	<10	PPB	!
TOTAL SOLIDS	88000	%	!
TOTAL KJELDAHL NITROGEN	<50	PPB	!
TOTAL PHOSPHORUS	13	PPB	!

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ENVIRONMENTAL SERVICES

03/22/89 LABORATORY REPORT

S080 8432156 W61

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S13062 WATER/PROJECT # 25400XH/MW #8
DATE COLLECTED 02/20/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	
CONFIRMATION ?	N/A	PPB	!
BARIUM - SOLUBLE	40	PPB	!
CADMIUM - SOLUBLE	<10	PPB	!
CHROMIUM - SOLUBLE	10	PPB	!
LEAD - SOLUBLE	200	PPB	!
SILVER - SOLUBLE	<10	PPB	!
ARSENIC - SOLUBLE	<10	PPB	!
SELENIUM - SOLUBLE	38	PPB	!
MERCURY - SOLUBLE	0.8	PPB	!
ACENAPHTHENE	<10	PPB	!
ACENAPHTYLENE	<10	PPB	!
ANTHRACENE	<10	PPB	!
BENZIDINE	<10	PPB	!
BENZO (A) ANTHRACENE	<10	PPB	!
BENZO (A) PYRENE	<10	PPB	!
BENZO(B)FLUORANTHENE	<10	PPB	!
BENZO(G,H,I)PERYLENE	<10	PPB	!
BENZO(K)FLUORANTHENE	<10	PPB	!
BIS (2-CHLOROETHOXY) METHA	<10	PPB	!
BIS (2-CHLOROETHYL) ETHER	<10	PPB	!
BIS (2-CHLOROISOPROPYL) ET	<10	PPB	!
BIS (2-ETHYLHEXYL) PHTHALA	<10	PPB	!
4-BROMOPHENYL PHENYL ETHER	<10	PPB	!
BUTYL BENZYL PHTHALATE	<10	PPB	!
2-CHLORONAPHTHALENE	<10	PPB	!
4-CHLOROPHENYL PHENYL ETHE	<10	PPB	!
CHRYSENE	<10	PPB	!
DIBENZO(A,H)ANTHRACENE	<10	PPB	!
1,2-DICHLOROBENZENE	<10	PPB	!
1,3-DICHLOROBENZENE	<10	PPB	!
1,4-DICHLOROBENZENE	<10	PPB	!

METHODS FOR CHEMICAL ANALYSIS OF WATER AND WASTES, 1979, EPA-600/4-79-020.
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ENVIRONMENTAL SERVICES
CHEM-BIO CORPORATION
140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005

S080 8432156 W61

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S13062 WATER/PROJECT # 25400XH/MW #8
DATE COLLECTED 02/20/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	
3,3'-DICHLOROBENZIDINE	<10	PPB	!
DIETHYL PHTHALATE	<10	PPB	!
DIMETHYL PHTHALATE	<10	PPB	!
DI-N-BUTYL PHTHALATE	<10	PPB	!
2,4-DINITROTOLUENE	<10	PPB	!
2,6-DINITROTOLUENE	<10	PPB	!
DI-N-OCTYL PHTHALATE	<10	PPB	!
1,2-DIPHENYLHYDRAZINE	<10	PPB	!
FLUORANTHENE	<10	PPB	!
FLUORENE	<10	PPB	!
HEXACHLOROBENZENE	<10	PPB	!
HEXACHLOROBUTADIANE	<10	PPB	!
HEXACHLOROCYCLOPENTADIENE	<10	PPB	!
HEXACHLOROETHANE	<10	PPB	!
INDENO(1,2,3,C,D)PYRENE	<10	PPB	!
ISOPHORONE	<10	PPB	!
NAPHTHALENE	<10	PPB	!
NITROBENZENE	<10	PPB	!
N-NITROSODIMETHYLAMINE	<10	PPB	!
N-NITROSO-DI-N-PROPYLAMINE	<10	PPB	!
N-NITROSODIPHENYLAMINE	<10	PPB	!
PHENANTHRENE	<10	PPB	!
PYRENE	<10	PPB	!
1,2,4-TRICHLOROBENZENE	<10	PPB	!
2-CHLOROPHENOL	<25	PPB	!
2,4-DICHLOROPHENOL	<25	PPB	!
2,4-DIMETHYLPHENOL	<25	PPB	!
4,6-DINITRO-2-METHYLPHENOL	<25	PPB	!
2,4-DINITROPHENOL	<25	PPB	!
2-NITROPHENOL	<25	PPB	!
4-NITROPHENOL	<25	PPB	!
4-CHLORO-3-METHYLPHENOL	<25	PPB	!
PENTACHLOROPHENOL	<25	PPB	!

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111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S13062 WATER/PROJECT # 25400XH/MW #8
DATE COLLECTED 02/20/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	
PHENOL	<25	PPB	!
2,4,6-TRICHLOROPHENOL	<25	PPB	!
DICHLOROBROMOMETHANE	<1.0	PPB	!
DICHLORODIFLUOROMETHANE	<1.0	PPB	!
1,1-DICHLOROETHANE	<1.0	PPB	!
1,2-DICHLOROETHANE	<1.0	PPB	!
1,1-DICHLOROETHYLENE	<1.0	PPB	!
1,2-DICHLOROPROPANE	<1.0	PPB	!
DICHLOROPROPYLENE (MIXED)	<1.0	PPB	!
ETHYLBENZENE	<1.0	PPB	!
METHYL BROMIDE	<1.0	PPB	!
METHYL CHLORIDE	<1.0	PPB	!
METHYLENE CHLORIDE	3.0	PPB	!
1,1,2,2-TETRACHLOROETHANE	<1.0	PPB	!
TETRACHLOROETHYLENE	<1.0	PPB	!
TOLUENE	<1.0	PPB	!
1,2-TRANSDICHLOROETHYLENE	<1.0	PPB	!
1,1,1-TRICHLOROETHANE	<1.0	PPB	!
1,1,2-TRICHLOROETHANE	<1.0	PPB	!
TRICHLOROETHYLENE	<1.0	PPB	!
TRICHLOROFLUOROMETHANE	<1.0	PPB	!
VINYL CHLORIDE	<1.0	PPB	!
ALDRIN	<0.2	PPB	!
ALPHA-BHC	<0.2	PPB	!
BETA-BHC	<0.2	PPB	!
GAMMA-BHC (LINDANE)	<0.2	PPB	!
DELTA-BHC	<0.2	PPB	!
CHLORDANE	<0.2	PPB	!
4,4'-DDT	<0.2	PPB	!
4,4'-DDE	<0.2	PPB	!
4,4'-DDD	<0.2	PPB	!
DIELDRIN	<0.2	PPB	!
ENDOSULFAN I	<0.2	PPB	!

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111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE 89052-S13062 WATER/PROJECT # 25400XH/MW #8
DATE COLLECTED 02/20/89 DATE RECEIVED 02/21/89

TEST NAME	RESULT	UNITS	
ENDOSULFAN II	<0.2	PPB	!
ENDOSULFAN SULFATE	<0.2	PPB	!
ENDRIN	<0.2	PPB	!
ENDRIN ALDEHYDE	<0.2	PPB	!
HEPTACHLOR	<0.2	PPB	!
HEPTACHLOR EPOXIDE	<0.2	PPB	!
TOXAPHENE	<0.2	PPB	!
PCB'S - SOLIDS, OIL, WASTE	N/T	PPM	!
PCB'S IN WATER	<0.5	PPB	!
CALCIUM - TOTAL	180000	PPB	!
POTASSIUM - TOTAL	9600	PPB	!
CHLORIDE	<10000	PPB	!
PH (UNITS)	8.3		!
	PH DONE ON 10% SOLUTION.		
SULFATE	15000	PPB	!
TOTAL CYANIDE	<10	PPB	!
TOTAL SOLIDS	85000	%	!
TOTAL KJELDAHL NITROGEN	59	PPB	!
TOTAL PHOSPHORUS	37	PPB	!

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ENVIRONMENTAL SERVICES
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05/23/88 LABORATORY REPORT

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: D. GRUMANN

SAMPLE 88130-S14106 PROJECT # 25400-XF/SOIL/B-12
DATE COLLECTED 05/03/88 DATE RECEIVED 05/09/88

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CALCIUM - TOTAL	28000	PPM				
POTASSIUM - TOTAL	240	PPM				
BARIUM - EP			0.08	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			<0.5	MG/L	5.0	
SILVER - EP			0.14	MG/L	5.0	
ARSENIC - EP			0.004	MG/L	5.0	
SELENIUM - EP			<0.002	MG/L	1.0	
MERCURY - EP			<0.0002	MG/L	0.2	
CHLORIDE	40	PPM				
PH (UNITS)	6.9				2.0-12.5	
	PH DONE ON 10% SOLUTION.					
SULFATE	9000	PPM				
TOTAL SOLIDS	93	%				
TOTAL KJELDAHL NITROGEN	270	PPM				
TOTAL PHOSPHORUS	7.2	PPM				

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IF YOU HAVE ANY QUESTIONS PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT. FAX # 414-764-0486
ANY REMAINING WASTE SAMPLES WILL BE RETURNED TO THE ADDRESS LISTED ABOVE 6 WEEKS FROM THE RECEIVING DATE OF SAMPLE. WI DNR LAB CERTIFICATION #241283020/A.I.H.A. ACCREDITED.

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05/23/88 LABORATORY REPORT

S080 8423007 W61

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: D. GRUMANN

SAMPLE 88130-S14185 PROJECT # 25400XF/SOIL/B-19
DATE COLLECTED 05/03/88 DATE RECEIVED 05/09/88

TEST NAME	RESULT	UNITS	EP TOXICITY		EP LIMIT	HAZ.CODE
CALCIUM - TOTAL	70000	PPM				
POTASSIUM - TOTAL	130	PPM				
BARIUM - EP			0.15	MG/L	100.0	
CADMIUM - EP			<0.05	MG/L	1.0	
CHROMIUM - EP			<0.05	MG/L	5.0	
LEAD - EP			<0.5	MG/L	5.0	
SILVER - EP			0.12	MG/L	5.0	
ARSENIC - EP			<0.001	MG/L	5.0	
SELENIUM - EP			<0.002	MG/L	1.0	
MERCURY - EP			<0.0004	MG/L	0.2	
CHLORIDE	60	PPM				
PH (UNITS)	8.0				2.0-12.5	
	PH DONE ON 10% SOLUTION.					
SULFATE	440	PPM				
TOTAL SOLIDS	54	%				
TOTAL KJELDAHL NITROGEN	80	PPM				
TOTAL PHOSPHORUS	1.1	PPM				
PCB'S - SOLIDS, OIL, WASTE	<1.0	PPM				

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ILLINOIS EPA GENERIC FUEL CLEAN-UP OBJECTIVES

Parameter	Groundwater Objective	Soil Objective	Basis	ADL (1) Water	ADL (1) Soil
Benzene *	5 µg/l	5 µg/kg	MCL	5 µg/l	5 µg/kg
Toluene *	2,000 µg/l	2,000 µg/kg	MCLG	5 µg/l	5 µg/kg
Ethylbenzene *	680 µg/l	13,600 µg/kg	Prop MCLG	5 µg/l	5 µg/kg
Xylenes (Total) *	440 µg/l	440 µg/kg	MCL	15 µg/l	15 µg/kg
N-Hexane **	1,400 µg/l	1,400 µg/kg	(3)	10 µg/l	10 µg/kg
1,2 Dichloroethane **	5 µg/l	5 µg/kg	MCL	5 µg/l	5 µg/kg
Lead **	50 µg/l	50 µg/l (2)	35 IAC 302.304	1 µg/l	
Naphthalene ***	790 µg/l	15,800 µg/kg	1/10 96 hr. TLm	10 µg/l	660 µg/kg
Carcinogenic PNA's (Total)	0.0028 µg/l	0.056 µg/kg	USEPA WQ Crit.		
Benzo (a) anthracene				0.13 µg/l	8.7 µg/kg
Benzo (a) pyrene				0.23 µg/l	15 µg/kg
Benzo (b) fluoranthene				0.18 µg/l	12 µg/kg
Chrysene				1.5 µg/l	100 µg/kg
Dibenzo (a,h) anthracene				0.3 µg/l	20 µg/kg
Non-Carcinogenic PNA's *** (Total)	2.3 µg/l	46 µg/kg	1/10 96 hr. TLm		
Acenaphthene				18 µg/l	1,200 µg/kg
Acenaphthylene				10 µg/l	660 µg/kg
Anthracene				6.6 µg/l	660 µg/kg
Benzo (g,h,i)				0.76 µg/l	51 µg/kg
Benzo (K) fluoranthene				0.17 µg/l	11 µg/kg
Fluoranthene				2.1 µg/l	140 µg/kg
Fluorene				2.1 µg/l	140 µg/kg
Indeno (1,2,3-c,d) pyrene				0.43 µg/l	29 µg/kg
Phenanthrene				6.4 µg/l	660 µg/kg
Pyrene				2.7 µg/l	180 µg/kg

* Apply to all petroleum clean-ups.
** Apply only to gasoline clean-ups.
*** Apply to all petroleum clean-ups with the exception of gasoline.

(1) Acceptable Detection Limit.
(2) Concentration in E.P. Toxicity extract of soil.
(3) Long-term health advisory reduced by a factor of 10 to represent lifetime exposure.

SW-846 Analytic Laboratory Procedure (USEPA) should be used to determine all contaminant levels.

Volatile contaminant levels	-	methods 5030 and 8240
Base neutral contaminant levels	-	methods 8270 and 8250
PNA contaminant levels	-	method 8310
Lead in soil contaminated levels	-	E.P. Toxicity

The clean-up objectives listed above may be revised as new standards or criteria become available.

GUIDANCE REGARDING THE CLASSIFICATION AND HANDLING OF LOW-LEVEL CONTAMINATED URBAN FILL MATERIAL

Based on the analytical testing results of soil sasmples from the Chicago Park District Dedication property, and detected low levels of PNAs and VOCs, some of the on-site soil and fill materials could be classified as special waste according to discussions of current regulatory agency interpretations of waste control legislation. While the amounts of soil likely to be involved in the proposed development of these properties is small, the character of the fill may result in the material being classified as special waste and the proper handling and disposal of these materials may be required. It should be noted that all fill soils showing some evidence of contamination need not be removed, but only those soils excavated as construction spoil.

The handling of special wastes typically involves properly manifesting the waste materials, and transporting and disposing of them at a licensed special waste landfill. In the past, site derived waste fill from this general area has been handled as excavation spoil and construction debris and disposed in a regular landfill or other appropriate locations. Special handling and disposal of these materials has not been common construction practice. However, in the absence of explicit written guidance on this issue, our discussions with the IEPA appear to indicate that interpretation of the relevant regulations is still evolving and may eventually encompass how such construction wastes are treated.

Regarding USEPA and Illinois EPA guidance on handling the materials, neither of the agencies' regulations indicate any of the chemicals at the concentrations present are hazardous waste. This classification removes the material from consideration under the Resource Conservation and Recovery Act (RCRA). The material is also excluded from classification under CERCLA or Superfund as hazardous waste materials.

Illinois has an additional classification of waste material specified as "Special Waste" for industrial process waste and pollution control waste. A designation of whether or not material qualifies as special waste can be obtained by requesting a determination from the Permits Section, Division of Land Pollution, Illinois EPA in Springfield, to the attention of Mr. Larry Eastep. Such a determination may take several weeks.

Newly adopted Illinois legislation, HB-3666, specifies that any material removed from a waste disposal site is classified "Special Waste" requiring manifesting and disposal at permitted facilities. Although the specific conditions at the Chicago Park District Dedication properties have not been discussed. in telephone

conversations with the Illinois EPA, it was the Illinois EPA's opinion that the cinder, ash, rubble, and soil fill material similar to that present on the site would be classified as a waste disposal facility. If that opinion is correct, then the obligation to treat this material as special waste follows directly.

We do not have a history on how this obligation has been enforced as the legislation was enacted September, 1988, and, we understand, became effective January 1, 1989.

In the event any excavation spoil material is generated and the material is to be handled as special waste, the procedures and obligations for reporting to the state EPA include several alternatives. Two authorizations are required for disposal and management of special waste. The material, if classified special waste, must be transported under manifest by a licensed special waste hauler and disposed in a permitted special waste landfill. The receiving landfill will require a representative sample to verify that the material is not hazardous waste. That verification or characterization of the waste may take two weeks. Additionally, the Illinois EPA needs to issue a waste generator number to the property generating the waste material. That number can be issued through direct application to the IEPA by a request for an emergency incident number, or a supplemental waste stream permit can be requested by the landfill. The emergency incident number is available in a matter of a few days, although IEPA is reluctant to issue the numbers through this method except in case of emergency, but this method does involve direct notice to IEPA and will almost certainly result in follow-up requests for information and documentation of the clean-up effort. That request also usually includes a request for groundwater monitoring wells on the property. The supplemental waste stream permit generator number is issued by the Illinois EPA through the landfill, and offers some anonymity among the numerous waste streams handled by the landfill. However, the generator number issued by that method may take eight weeks or more to obtain.

From a practical sense, it should be recognized that the presence of this material is not restricted to the Chicago Park District Dedications. STS has conducted similar sampling and analyses on numerous nearby properties. Attached please find comparisons between the PNA chemical concentrations at other sites in the North Loop and near north area. The chemicals are of concern as they are generally known or suspected carcinogens.

When evaluating the impact of this material on the Chicago Park District Property, note that these chemicals are not particularly mobil as they have low solubility and thus will not tend to migrate in the groundwater beneath the site, and have low volatility, thus will not tend to be discharged into the air at the property. The environmental risk is primarily from the standpoint of direct contact with the

material in the soils. Given the proposed pavement and soil cover planned for the development of these properties, the potential risk of exposure is judged as extremely slight.

These soils and fill materials have been managed in the past as construction debris, placed in landfills along with other construction rubble and debris. The potential risk to the public from these handling methods is, in our opinion, minimal.

In the absence of a determination from the Illinois EPA classifying this material, there remains a potential that at some point in the future material removed from the site will be designated as special waste. It is apparent from the information presented in this letter that there is a state of flux and a high degree of uncertainty in handling these soils and fill materials.

Chemical Data for Chicago, Illinois
Fill Material
(µg/g)

	A-1*	A-2*	B-1	B-2	B-3	C-1	C-2	C-3	D-1	D-2	D-3	D-4	D-5
Acenaphthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Acenaphthylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Anthracene	13.2	BDL	BDL	4	BDL	0.4	20	6.7	BDL	BDL	BDL	BDL	BDL
Benzidene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzo (a) Anthracene	17.2	12	BDL	4	40	0.21	13	4.5	BDL	BDL	BDL	BDL	BDL
Benzo (b) fluoranthene	BDL	BDL	BDL	BDL	43	BDL	BDL	BDL	BDL	BDL	8	BDL	BDL
Benzo (k) fluoranthene	BDL	BDL	BDL	BDL	20	BDL	BDL	BDL	28	39	BDL	78	18
Bis (2-Ethylhexyl Phthalate)	BDL	BDL	BDL	BDL	BDL	0.82	3.8	1.9	BDL	BDL	9	BDL	3
Chrysene	17.8	13	BDL	4	41	0.18	13	4.6	30	53	BDL	55	22
Dibenzo (a,h) anthracene	BDL	BDL	BDL	BDL	15	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dimethyl phthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2,4-Dinitrotoluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Di-n-butyl phthalate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7	BDL	BDL
Fluroanthene	26.2	17	1	7	78	0.48	26	7.3	30	50	BDL	106	17
Fluorene	BDL	BDL	BDL	BDL	12	BDL	BDL	BDL	BDL	BDL	BDL	BDL	2
Indeno (1,2,3-cd) pyrene	BDL	BDL	BDL	BDL	36	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Napthalene	BDL	BDL	BDL	BDL	12	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Nitrobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	5	BDL	BDL
Phenanthrene	37.1	29	2	9	90	0.38	29	10	36	61	7	121	14
Pyrene	25.3	16	1	8	81	BDL	61	25	28	42	2	90	15
Benzo (a) pyrene	BDL	BDL	BDL	4	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	5
Benzo (ghi) perylene	BDL	BDL	BDL	BDL	44	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

*Site in 60611 Postal Zip Code Area

	E-1	E-2	E-3	E-4	E-5	E-6	F-1	F-2	F-3	G-1	G-2	H-1	H-2
Acenaphthene	BDL	BDL	BDL	1.0	BDL	BDL	BDL	BDL	BDL	BDL	BDL	8.9	0.98
Acenaphthylene	0.053	BDL	BDL	0.038	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.95	BDL
Anthracene	0.029	2.7	BDL	1.2	1.4	0.49	BDL	17	4.3	2	11	85	12
Benzidene	BDL	BDL	BDL	BDL	BDL	BDL	34	BDL	BDL	BDL	BDL	BDL	BDL
Benzo (a) Anthracene	0.14	0.83	BDL	0.46	0.59	0.24	BDL	BDL	BDL	BDL	3	46	6.0
Benzo (b) fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1	7	BDL	BDL
Benzo (k) fluoranthene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	6	BDL	2.0
Bis (2-Ethylhexyl Phthalate)	1.5	1.3	0.44	2.2	0.14	0.14	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chrysene	0.16	0.99	BDL	0.59	0.62	0.24	5.2	BDL	BDL	BDL	4	49	6.2
Dibenzo (a,h) anthracene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	2	BDL	BDL
Dimethyl phthalate	0.43	0.68	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2,4-Dinitrotoluene	BDL	0.85	BDL	BDL	BDL	BDL	BDL	4.5	BDL	BDL	BDL	BDL	BDL
Di-n-butyl phthalate	BDL	BDL	BDL	BDL	BDL	BDL	2.3	BDL	BDL	1	BDL	BDL	BDL
Fluroanthene	0.27	2.7	BDL	0.87	1.3	0.48	13	BDL	6.2	BDL	6	79	9.6
Fluorene	BDL	BDL	BDL	1.6	BDL	BDL	BDL	BDL	BDL	BDL	BDL	8.3	BDL
Indeno (1,2,3-cd) pyrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	2	29	BDL
Napthalene	BDL	BDL	BDL	8.6	BDL	BDL	BDL	8.1	BDL	BDL	BDL	BDL	BDL
Nitrobenzene	BDL	BDL	BDL	4.2	BDL	BDL	BDL	BDL	BDL	1	BDL	BDL	BDL
Phenanthrene	BDL	BDL	BDL	BDL	BDL	BDL	3.6	BDL	BDL	2	5	70	6.2
Pyrene	BDL	BDL	BDL	BDL	BDL	BDL	7.7	BDL	6.2	BDL	11	BDL	BDL
Benzo (a) pyrene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	4	BDL	BDL
Benzo (ghi) perylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	4	20	BDL

Note: 1) All units are in $\mu g/g$ which is equivalent to parts per million (ppm)
2) BDL - Below Detection Level
3) See attached map for general sampling locations

CHEM-BIO CORPORATION
140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005

ENVIRONMENTAL SERVICES

02/28/89 INDUSTRIAL HYGIENE LABORATORY REPORT

S080 8432176 W81
CS/05/ / /

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: TIM DAHLSTRAND

SAMPLE NUMBER - 89053-S13061
CLIENT SAMPLE - 25400-XH A-1
SOIL
LOCATION/PERSONNEL -

ASBESTOS IDENTIFICATION

SAMPLE DESCRIPTION :
WET SOIL SAMPLE WITH AGGREGATE

NO ASBESTOS DETECTED

CELLULOSE	1 %
AMORPHOUS MATERIAL	99 %

DATE COLLECTED - 02/22/89 DATE RECEIVED - 02/22/89
SAMPLED BY - STS CONSULTANTS LTD.-CHGO
QUANTITATION METHOD - EQUIVALENT ESTIMATION

PRETREATMENT/COMMENTS-TRACE OF GLASS FIBER OBSERVED
SAMPLE DRIED PRIOR TO ANALYSIS

ANALYTICAL METHOD - POLARIZED LIGHT MICROSCOPY WITH DISPERSION STAINING
ANALYST - J. WALSH
DATE OF ANALYSIS - 02/27/89

OSHA REFERENCE METHOD. NIOSH MANUAL OF ANALYTICAL METHODS, 3RD EDITION. EPA 600/M4-82-020 TEST METHOD. AMERICAN INDUSTRIAL HYGIENE ASSOCIATION CERTIFICATE # 325. US EPA INTERIM ACCREDITATION # 5648. NVLAP #1028. SAMPLES WILL BESTORED FOR 6 WEEKS BEFORE DISPOSAL UNLESS OTHERWISE SPECIFIED. IF YOU HAVE ANY QUESTIONS PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT N/A = NOT APPLICABLE, N/R = NOT RECEIVED. APPROVAL KD

CHEM-BIO CORPORATION
ENVIRONMENTAL SERVICES
140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005

02/28/89 INDUSTRIAL HYGIENE LABORATORY REPORT

S080 8432176 W81
CS/05/ / /

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: TIM DAHLSTRAND

SAMPLE NUMBER - 89053-S13062
CLIENT SAMPLE - 25400-XH A-2
SOIL
LOCATION/PERSONNEL -

ASBESTOS IDENTIFICATION

SAMPLE DESCRIPTION:
WET SOIL SAMPLE WITH AGGREGATE AND CRUDE FIBER

NO ASBESTOS DETECTED	
GLASS/MINERAL WOOL	1 %
CELLULOSE	3 %
AMORPHOUS MATERIAL	96 %

DATE COLLECTED - 02/20/89 DATE RECEIVED - 02/22/89
SAMPLED BY - STS CONSULTANTS LTD.-CHGO
QUANTITATION METHOD - EQUIVALENT ESTIMATION

PRETREATMENT/COMMENTS-SAMPLE DRIED PRIOR TO ANALYSIS

ANALYTICAL METHOD - POLARIZED LIGHT MICROSCOPY WITH DISPERSION STAINING
ANALYST - J. WALSH
DATE OF ANALYSIS - 02/27/89

OSHA REFERENCE METHOD. NIOSH MANUAL OF ANALYTICAL METHODS, 3RD EDITION. EPA 600/M4-82-020 TEST METHOD. AMERICAN INDUSTRIAL HYGIENE ASSOCIATION CERTIFICATE # 325. US EPA INTERIM ACCREDITATION # 5648. NVLAP #1028. SAMPLES WILL BESTORED FOR 6 WEEKS BEFORE DISPOSAL UNLESS OTHERWISE SPECIFIED. IF YOU HAVE ANY QUESTIONS PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT N/A = NOT APPLICABLE, N/R = NOT RECEIVED. APPROVAL _____

ENVIRONMENTAL SERVICES
CHEM-BIO CORPORATION
140 EAST RYAN ROAD, OAK CREEK, WI 53154-4599 (414) 764-7005

02/28/89

INDUSTRIAL HYGIENE
LABORATORY REPORT

S080 8432176 W81
CS/05/ / /

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: TIM DAHLSTRAND

SAMPLE NUMBER - 89053-S13063
CLIENT SAMPLE - 25400-XH A-3
SOIL
LOCATION/PERSONNEL -

ASBESTOS IDENTIFICATION

SAMPLE DESCRIPTION :
WET SOIL SAMPLE WITH AGGREGATE AND FIBER

CHRYSOTILE ASBESTOS	2 %
CELLULOSE	3 %
AMORPHOUS MATERIAL	95 %

DATE COLLECTED - 02/20/89 DATE RECEIVED - 02/22/89
SAMPLED BY - STS CONSULTANTS LTD.-CHGO
QUANTITATION METHOD - EQUIVALENT ESTIMATION

PRETREATMENT/COMMENTS-SAMPLE DRIED PRIOR TO ANALYSIS

ANALYTICAL METHOD - POLARIZED LIGHT MICROSCOPY WITH DISPERSION STAINING
ANALYST - J. WALSH
DATE OF ANALYSIS - 02/27/89

OSHA REFERENCE METHOD. NIOSH MANUAL OF ANALYTICAL METHODS, 3RD EDITION. EPA 600/M4-82-020 TEST METHOD. AMERICAN INDUSTRIAL HYGIENE ASSOCIATION CERTIFICATE # 325. US EPA INTERIM ACCREDITATION # 5648. NVLAP #1028. SAMPLES WILL BESTORED FOR 6 WEEKS BEFORE DISPOSAL UNLESS OTHERWISE SPECIFIED. IF YOU HAVE ANY QUESTIONS PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT
N/A = NOT APPLICABLE, N/R = NOT RECEIVED. APPROVAL KD

CBC

MAR 08 1989

STS CONSULTANTS LTD.
NORTHBROOK, ILLINOIS 6006[illegible]

ENVIRONMENTAL SERVICES

CHEM-BIO CORPORATION
140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005

03/03/89 INDUSTRIAL HYGIENE LABORATORY REPORT

S080 8432392 W81
CS/05/ / /

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: DAVE GRUMMAN

SAMPLE NUMBER - 89059-S13061
CLIENT SAMPLE - 25400-XH A-3
LOCATION/PERSONNEL - 89053-S13063 (RERUN)

ASBESTOS IDENTIFICATION

SAMPLE DESCRIPTION :
GREY HOMOGENEOUS COMPACT PARTICULATE WITH GRAIN

CHRYSOTILE ASBESTOS	2 %
CELLULOSE	18 %
AMORPHOUS MATERIAL	80 %

DATE COLLECTED - 02/20/89 DATE RECEIVED - 02/28/89
SAMPLED BY - STS CONSULTANTS LTD.-CHGO
QUANTITATION METHOD - EQUIVALENT ESTIMATION

PRETREATMENT/COMMENTS-NONE

ANALYTICAL METHOD - POLARIZED LIGHT MICROSCOPY WITH DISPERSION STAINING
ANALYST - J. BROZOWSKI
DATE OF ANALYSIS - 02/28/89

OSHA REFERENCE METHOD. NIOSH MANUAL OF ANALYTICAL METHODS, 3RD EDITION. EPA 600/M4-82-020 TEST METHOD. AMERICAN INDUSTRIAL HYGIENE ASSOCIATION CERTIFICATE # 325. US EPA INTERIM ACCREDITATION # 5648. NVLAP #1028. SAMPLES WILL BESTORED FOR 6 WEEKS BEFORE DISPOSAL UNLESS OTHERWISE SPECIFIED. IF YOU HAVE ANY QUESTIONS PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT
N/A = NOT APPLICABLE, N/R = NOT RECEIVED. APPROVAL [illegible]

CHEM-BIO CORPORATION
140 EAST RYAN ROAD OAK CREEK, WI 53154-4599 (414) 764-7005

ENVIRONMENTAL SERVICES

02/28/89 INDUSTRIAL HYGIENE LABORATORY REPORT

S080 8432176 W81
CS/05/ / /

STS CONSULTANTS LTD.-CHGO
111 PFINGSTEN ROAD
NORTHBROOK ,IL 60062
ATTN: TIM DAHLSTRAND

SAMPLE NUMBER - 89053-S13883
CLIENT SAMPLE - 25400-XH A-4
SOIL
LOCATION/PERSONNEL -

ASBESTOS IDENTIFICATION

SAMPLE DESCRIPTION :
WET SOIL SAMPLE WITH AGGREGATE

NO ASBESTOS DETECTED

CELLULOSE	2 %
AMORPHOUS MATERIAL	98 %

DATE COLLECTED - 02/20/89 DATE RECEIVED - 02/22/89
SAMPLED BY - STS CONSULTANTS LTD.-CHGO
QUANTITATION METHOD - EQUIVALENT ESTIMATION

PRETREATMENT/COMMENTS-SAMPLE DRIED PRIOR TO ANALYSIS
TRACE QUALITITES OF GLASS FIBER OBSERVED

ANALYTICAL METHOD - POLARIZED LIGHT MICROSCOPY WITH DISPERSION STAINING
ANALYST - J. WALSH
DATE OF ANALYSIS - 02/27/89

OSHA REFERENCE METHOD. NIOSH MANUAL OF ANALYTICAL METHODS, 3RD EDITION. EPA 600/M4-82-020 TEST METHOD. AMERICAN INDUSTRIAL HYGIENE ASSOCIATION CERTIFICATE # 325. US EPA INTERIM ACCREDITATION # 5648. NVLAP #1028. SAMPLES WILL BESTORED FOR 6 WEEKS BEFORE DISPOSAL UNLESS OTHERWISE SPECIFIED. IF YOU HAVE ANY QUESTIONS PLEASE CONTACT OUR CLIENT SERVICE DEPARTMENT
N/A = NOT APPLICABLE, N/R = NOT RECEIVED. APPROVAL

BULK ASBESTOS SURVEY
PARCEL AT NORTH WATER STREET
EAST OF LAKE SHORE DRIVE
CHICAGO, ILLINOIS

CCA Project No. 1534-89
March 24, 1989

CARNOW, CONIBEAR & ASSOCIATES, LTD.

BULK ASBESTOS SURVEY
PARCEL AT NORTH WATER STREET
EAST OF LAKE SHORE DRIVE
CHICAGO, ILLINOIS

I. INTRODUCTION

Carnow, Conibear & Associates, Ltd. (CCA) was retained by David L. Grumman of STS Consultants, Ltd., located 111 Pfingsten Road Northbrook, Illinois to collected bulk samples from suspected asbestos-containing material (ACM). This survey was conducted at the parcel located on North Water Street, East of Lake Shore Drive on March 9, 1989 under CCA Project No. 1534-89.

II. METHODOLOGY

Samples were collected in accordance with CCA bulk sampling standards procedures. These procedures were developed in-house and are based on methods described in EPA guidelines and similar procedures.

Analysis of samples was performed by CCA's laboratory in accordance with the USEPA Interim Method #EPA-600/M4-82-020 (December1982) by utilizing dispersion staining and polarized light microscopy. Periodically, samples are selected at random and sent to a second laboratory for a quality assurance crosscheck. CCA's laboratory participates in the Environmental Protection Agency's Bulk Asbestos Sample Quality Assurance Program and is interimly accredited for bulk asbestos analysis. Ten percent of all samples submitted to the laboratory are selected at random and reanalyzed in house as part of CCA's in-house quality control program.

II. DISCUSSION

Refer to Table I for results of samples analysis. Seven samples, considered to be potential sources of ACM, were collected at the Parcel on North Water Street, East of Lake Shore Drive, in Chicago, Illinois. The samples were collected from surface soil from the fill pile occupying the southern one-half of the survey area (See attached map). Sample analysis confirmed that the seven samples collected did not contain asbestos. CCA also performed a visual inspection of the fill pile and did not observe any suspect asbestos-containing materials.

Bulk Asbestos Survey
Parcel At North Water Street
East of Lake Shore Drive
Chicago, Illinois

Carnow, Conibear & Associates, Ltd. is pleased to have been of service to you and if you have any questions or require any additional information, please contact me.

Sincerely,

CARNOW, CONIBEAR & ASSOCIATES, LTD.

Guillermo Garcia
Industrial Hygienist

William S. Williams
Manager of Asbestos Services

GG/WSW:dh
16100-01

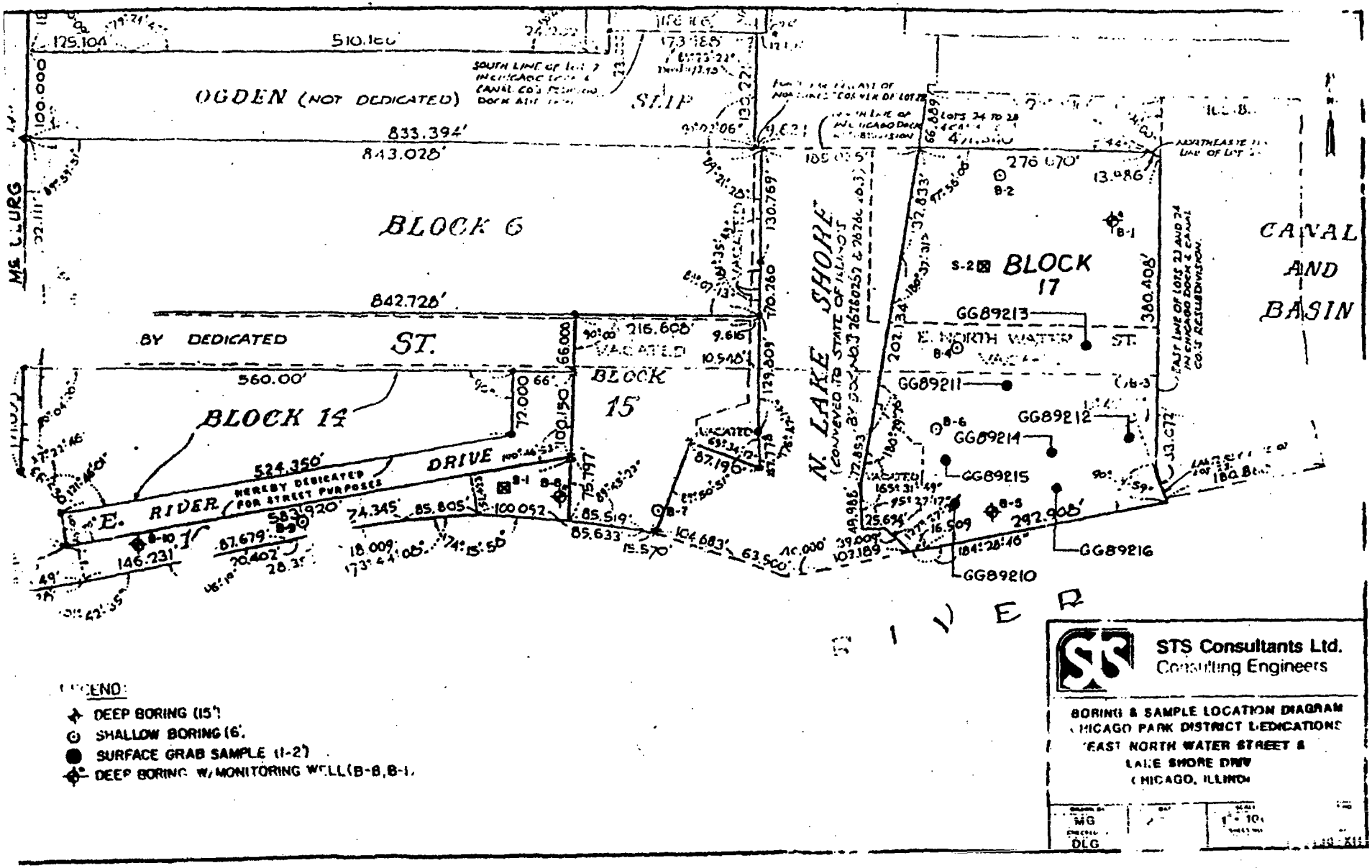
TABLE I
BULK SAMPLE RESULTS
March 9, 1989
PARCEL AT NORTH WATER STREET
EAST OF LAKE SHORE DRIVE
CHICAGO, ILLINOIS

Sample Number	Description	Asbestos Content
GG89210	Southwest, base surface soil	None*
GG89211	Northwest, base surface soil	None*
GG89212	East, top surface soil	None*
GG89214	Middle, top surface soil	None*
GG89215	Middle west, top surface soil	None*
GG89216	East, top surface soil	None*

* - Denotes none detected by method utilized.

[a] - All bulk samples were analyzed in accordance with the USEPA Interim Method #EPA-600/M4-82-020 (December, 1982) by utilizing dispersion staining and polarized light microscopy.

16100-01



LEGEND:

- DEEP BORING (15')
- SHALLOW BORING (6')
- SURFACE GRAB SAMPLE (1-2')
- DEEP BORING W/MONITORING WELL (B-8, B-1)

STS Consultants Ltd.
Consulting Engineers

BORING & SAMPLE LOCATION DIAGRAM
CHICAGO PARK DISTRICT DEDICATIONS
EAST NORTH WATER STREET &
LAKE SHORE DRIVE
CHICAGO, ILLINOIS

MG
DLG